GROW YOUR OWN

Complete HANDYMAN ENCYCLOPEDIA

24

EGGPLANT
LOGANBERRIES

DO-IT-YOURSELF

Complete
Handyman

do-it-yourself

Encyclopedia

do-it-

low yield

medium yield

high yield

minimum effort

needs more care

requires special attention

crops in three months or less

crops in 4-12 months

crops in over 12 months

Complete Handyman yourself Encyclopedia

A STEP BY STEP GUIDE TO SUCCESSFUL
VEGETABLE AND FRUIT GROWING
BASED ON ALL 52 GARDENING HANDBOOKS
PUBLISHED UNDER THE TITLE

VOLUME
24
EGGPLANT
LOGANBERRIES

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Eggplants

Solanum melongena (fam. *Solanaceae*)
Perennial, cultivated as a **half-hardy annual** in temperate climates
Sowing to harvesting time: about 13–17 weeks; 7–11 weeks from plants
Size: plant reaches an average height of 3 ft (90 cm); fruits 4–10 in (10–25 cm) long
Yield: four plants per 10 ft (3 m) row; four fruits per plant

Harvested young and cooked properly, eggplants are a delicious and versatile vegetable, and add a luxury touch to any meal. Because they are tropical in origin, they are not as widely grown commercially in cool temperate climates as some other crops. If you can provide warm growing conditions, either in a greenhouse, cold frame, or outdoors with plastic tunnels, you can easily raise your own eggplants and have good crops of this unusual vegetable from midsummer onwards. They do not require a lot of growing space, and five or six plants should be more than enough for a small household. The plants, particularly when in fruit, are most attractive, and make excellent pot plants in a warm sunny room, or outdoors as focal points in a mixed border.

The eggplant belongs to the same family (*Solanaceae*) as the tomato and potato, but it is by far the least hardy of the three, and the one requiring the most protection from sudden drops in temperature. Although treated in the kitchen as a vegetable, the edible portion is botanically a fruit—actually a very large berry filled with seeds. The type most often seen has purple shiny skin and creamy white flesh with a high water content. There are also varieties which have white, red, yellow, or striped skins, but these are not commonly available. The name "eggplant" comes from one such variety, which has fruits similar to a goose egg in appearance. The shape of the fruit also varies, from roughly egg shape and squat to the elongated pear shape. Its fully grown size is between about 4 in (10 cm) and 1 ft (30 cm).

Although eggplants need plenty of sunlight and warmth to succeed, given a bit of luck with the weather, or artificial heat and glass protection, you can grow good crops which will be far superior in taste to those sold in stores.

Suitable site and soil

Tropical in origin, eggplants have high temperature and sunlight requirements, and are tricky subjects for growing outdoors in a cool climate. Even more temperamental than tomatoes, they will simply fail to crop in cool, wet, sunless

R. J. Corbin

▲ *Eggplants ready for picking; the straw mulch keeps down weeds and retains soil moisture.*

summers. Usually they are best grown in greenhouses, unless the summer is an exceptionally hot one, or your garden is in a very mild, sheltered area. Outside, grow them against a warm south-facing wall, or give them protection with cloches or other covers.

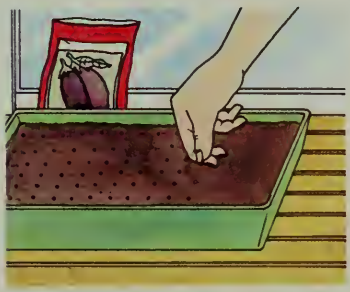
Eggplants need fertile, well-drained soil; dig over the soil and enrich it with garden compost or well rotted manure about a month before setting out the plants.

Sowing

Although it is possible to get crops from seed sown outdoors in mid to late spring in mild or warm climates, it is safer to sow the seed under glass in early spring and transplant outdoors in early summer. Plants given this head start are more likely to produce good crops before the arrival of the first autumn chills. In the North, this is necessary as growing eggplants in a cool temperate climate is a race against the calendar.

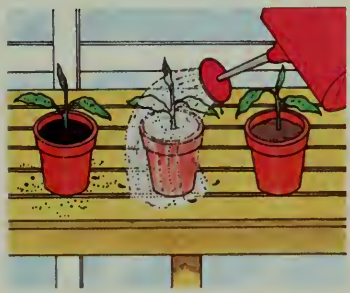
For eggplants that will be transplanted outdoors, sow the seeds in early spring (March 1 to April 1 in the North). You need a minimum temperature of 64° F (18° C) for germination to take place satisfactorily, so if the weather is very cold, you will need a heated greenhouse

SOWING AND REPOTTING

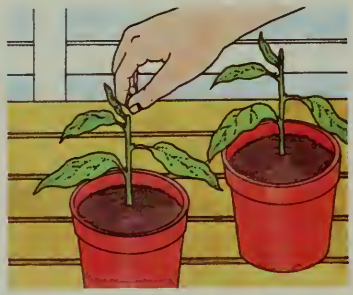


1. Sow seeds in early spring in a greenhouse or warm window 1 in (2.5 cm) apart; use good quality soil mixture.

2. As soon as three leaves have formed, transplant seedlings into 3 in (7.5 cm) pots; plant deeply.



3. Keep the soil well-watered; at this stage the temperature can be lowered to 50° F (10° C).



4. When pots are outgrown, repot into 6 in (15 cm) pots; pinch out growing point when 6 in (15 cm) high.

or warm windowsill. Sow the seeds 1 in (2.5 cm) apart in a seed flat or pot filled with sterilized soil such as that used for sowing tomato seeds. Germination is slow, and may take up to three weeks, especially if the temperature is lower than that specified, so do not panic if nothing seems to be happening. Keep the atmosphere fairly dry until the seedlings appear.

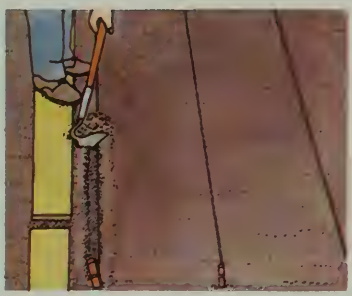
As soon as three leaves have formed, carefully prick out the seedlings into 3 in (7.5 cm) pots filled with a good potting soil. From this stage onward, the temperature can be somewhat lower, but do not let it fall below 50° F (10° C), particularly at night. Keep them well watered, and when the roots have filled the pot, probably sometime during midspring, pot them on into 6 in (15 cm) pots, filled with a richer potting mixture than that used previously.

Outdoor growing

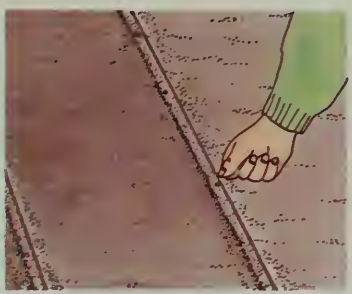
In midspring, begin hardening off the plants, which by then will be in their 3 in (7.5 cm) pots, ideally in a cold frame. Open the cover during the day, and shut it at night or when the weather turns cold. In late spring when all danger of frost is over, plant them out, spaced 2 ft (60 cm) apart. If the soil is dry at the

OUTDOOR SOWING

1. Place imported cloches or plastic tunnels over soil about two weeks before sowing outdoors, to warm up soil.



2. Make the drills 1 in (2.5 cm) deep; if you are sowing more than one row, make rows 2 ft (60 cm) apart.



3. Eggplant seeds are large enough to sow individually; space them 1 ft (30 cm) apart; thin to 2 ft (60 cm) apart.

time of transplanting, water the plants and the permanent bed thoroughly the night before.

If you want to try sowing eggplant seeds outdoors, warm the soil up first with a plastic tent or, if available, imported cloches. Place over the soil about two weeks before you intend sowing, and immediately after sowing, return the covers to provide warmth for the germinating seeds. The seeds should be sown in drills 1 in (2.5 cm) deep; as they are large they can be sown singly, about 1 ft (30 cm) apart, and later thinned to a spacing of 2 ft (60 cm). If you have more than one row, space them 2 ft (60 cm) apart also.

Care and cultivation

Pinch out the growing points of the plants when they are about 6 in (15 cm) high. This encourages the plants to produce sideshoots, on which the mauve self-pollinating flowers will later form, though the fruit will be produced slightly later than if not pinched.

Keep the plants well supplied with water, particularly in hot, dry weather. Spread a mulch of lawn mowings or straw around the plants once they are growing well to conserve soil moisture and suppress weeds. Once the flowers have set, use a proprietary tomato fertilizer at the manufacturer's recommended rates.

Red spider mite can be troublesome during mid to late summer, if the weather is hot and dry. The best precaution is to syringe the plants occasionally with a forceful stream of water, including the undersides of the leaves. Do not water unnecessarily, though, because an excessively moist atmosphere could encourage attack by botrytis, especially if the summer is a cool one, or the night temperature tends to be rather low.

The plants will need staking, particularly if they are exposed to strong wind. Use bamboo canes at least 4 ft (1.2 m) long, set 1 ft (30 cm) into the soil.

Plants growing under covers must have adequate head room; ultimately

3–3½ ft (90–105 cm) will be needed. Stand the covers on end, two to a plant, and place them on bricks to give additional height if necessary. You can remove them completely if the summer is a very hot one.

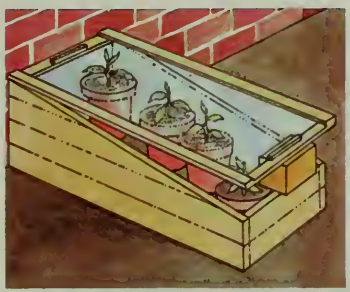
Although many fruitlets may form, in cool temperate climates it is best to restrict the number of fruits to a maximum of four per plant. Pinch out the additional fruitlets, so that all the plant's energy is concentrated on the production of the four selected fruits.

Growing under glass

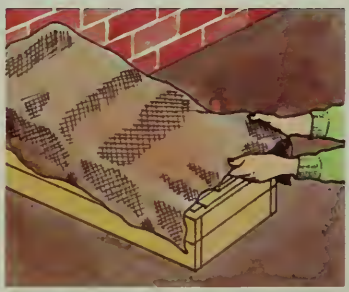
Eggplants can be grown entirely in a greenhouse or large cold frame where the season is too cool or too short. The

TRANSPLANTING

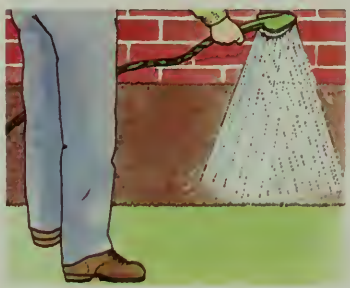
1. A month before setting out plants, dig soil over and enrich it with well rotted manure or garden compost.



2. Harden plants off in a cold frame; open frame lid during the day and shut it at night or in cold weather.



3. If frost threatens, give plants additional protection by placing sacking over closed frame lid.



4. If soil is dry at time of transplanting, water the plants and the permanent bed thoroughly.

5. Transplant eggplants 2 ft (60 cm) apart in all directions; avoid damaging the fragile roots.

CARE AND CULTIVATION

1. While fruits are forming, give plants liquid food, diluted according to manufacturer's instructions.

2. In hot weather, spray foliage forcefully as often as needed to wash off red spider mites.

additional heat and climatic stability this environment provides usually leads to heavier cropping. Sow the seeds in a heated greenhouse from late winter onwards, or in an unheated greenhouse in midspring.

Pot on the young plants as necessary, and when they are 6–8 in (15–20 cm) high, remove the plants from the pots and set them out 2 ft (60 cm) apart in the greenhouse or in a cold frame outdoors. Alternatively, plunge the pots up to their rims in ashes in the cold frame. In this case, they should be in a final pot size of 10 in (25 cm) and should not be plunged until this size has been reached, although they can still be put in the frame when 6–8 in (15–20 cm) high. Make sure there is at least 3 ft (90 cm) head room for the plants to grow comfortably, and, if necessary, raise the frame on bricks or concrete blocks.

Cultivation is the same as for outdoor-grown eggplants, but those grown under glass are particularly vulnerable to red spider mite attack, so inspect the plants regularly and frequently for signs of this pest. Botrytis can be troublesome also, in airless, cool conditions.

Growing in containers

Eggplants are excellent plants to grow in pots, tubs and other containers where space is limited. If well grown, they will produce as many fruits as those grown in the open ground.

3. In cool climates, do not allow more than four fruitlets to form; pinch out any extra as soon as you see them.

Sow as directed for growing outdoors. Transfer the seedlings from the seed flat or pots to the 3 in (7.5 cm) pots, then to 6 in (15 cm) pots and finally to the 10 in (25 cm) size. The soil mixture in these

large pots should consist of two parts by volume of good loam to one part each of leafmold and well rotted manure. Mix in a little sharp sand, to improve drainage. Remember to put a 1 in (2.5 cm) layer of broken crocks, small pieces of brick or other drainage material in the bottom of the pot, so that the drainage hole does not get clogged. Do not forget that the growing points are nipped out when the plants are about 6 in (15 cm) tall, to encourage the production of sideshoots.

Keep the pots in a greenhouse, or indoors in a sunny place; when the weather is warm and sunny, stand the pots outdoors. They can be kept on a balcony or terrace all the time, if it is warm and sheltered.

Because the soil in pots dries out much more quickly than soil in the open ground, it is essential that you water the plants regularly, and particularly in hot dry weather. They will also need feeding when the first fruits are starting to swell, and from then on until the last fruits have reached full size. Feed as directed under Care and Cultivation. Remember to supply a stake.

Chevron

←*Eggplants are particularly suitable for growing in pots, either outdoors in a warm, sheltered spot, or in a greenhouse or even a sunny room in the house. Remember that soil in pots tends to dry out quickly, so water regularly in dry weather, and feed as for plants grown in the open ground.*

Marshall Cavendish Clay Perry

▲ *Young eggplants in a growing bag.*

Harvesting

Eggplants are ready for picking when they are about 6 in (15 cm) long and have stopped swelling. The skin should be bright and shiny, and have a good, rich color. The purple varieties will have this color right from the time when they are first formed. Test for readiness by gently pressing the fruit with your thumb. If the indentation remains, swelling has stopped and the fruit is ready for picking. Do not leave fully ripe fruit on the plant as the gloss on the skin will quickly disappear and seeds will form inside the flesh, which makes the fruit less tasty. Overripe fruit left hanging on the plant will inhibit further fruit production, and reduced crop yields will result.

Harvest when fruit is about 6 in (15 cm) long, and skin is bright and shiny; cut with shears or a sharp knife.

The stem is sometimes prickly, so wear gloves and use shears or a really sharp knife to cut off the fruit. Unless the summer is exceptionally warm, eggplants grown under glass will be ready earlier and have a longer cropping season than those grown in the open. Cropping usually extends over four to six weeks, depending on the variety grown and the weather; in exceptionally hot summers, you may get crops for two months.

Exhibition tips

To have good sized fruits ready for late summer or early autumn shows, sow the seeds in early spring. Six is a frequent number shown, for both single dishes and as part of collections. Cut the fruit as near as possible to the show date, using a sharp knife to sever the stalk from the plant stem. Select fruit as uniform as possible in size, shape and color. It is much better to have six moderately sized eggplants than five moderately sized ones and one enormous specimen, which makes the others appear small by comparison.

Very little preparation is needed; simply wipe the fruit with a dry cloth. If you are travelling some distance to the show, wrap each in tissue paper, and pack the fruit tightly in a box, so that they do not roll about in transit. Do not pack them so tightly that they are crushed or bruised; use padding to wedge the fruit into position.

At the show bench, arrange the fruit in a shallow basket or plate. Never spray the eggplants with water to make them shiny, as water on the skin may cause discoloration and rapid decay. The judges will look for good sized fruit, well colored and without blemish.

Storage

It is an unfortunate fact of life for gardeners who love eggplants and can grow them that they do not store well. After being picked, eggplants will keep in a cool humid place but should be used within a few days. The only way to preserve them beyond that time is to cook them in a recipe such as eggplant parmigiana and freeze.

Varieties

Burpee Hybrid: drought- and disease-resistant; tall, vigorous, productive. Fruit oval, dark, glossy, purple.

Mission Bell: high quality, deep purple, abundant fruits; plant strong, upright. Good in South.

Early Hybrid: 10 days after Dusky, productive. Resists fusarium, other diseases; pear-shaped.

Dusky: very early and productive; good in North. Fruit small, black, cylindrical.

Florida Market: high yielding, vigorous. Fruit oval, large, black-purple, neckless.

Good Egg: early, phomosis-resistant; bushy. Dark, oval, medium-sized, good quality.

Jersey King: vigorous, productive; high, spreading bush. Fruits dark, cylindrical.

Long Purple: plants shorter; fruits long, slender, shiny violet, good flavor.

Brian Furner

▲ *Florida Market*

Brian Furner

▲ *Long Purple*

Brian Furner

▲ *Burpee Hybrid*

Bernard Alfieri

▲ *Good Egg*

Pests & Diseases

In temperate climates eggplants will not suffer from many troubles; in the list that follows the main ones are likely to be gray mold (botrytis), red spider mite and slugs. However, the Colorado potato beetle may also cause a lot of damage. There are also several wilt fungus diseases which are soil-borne and infect the roots, but these can be avoided if the crop is rotated, i.e. not grown on the same site in two or more successive years. Also, destroy infected plants.

Cutworms: these caterpillars feed on stems of young plants, often cutting them off at soil level. Protect eggplant seedlings with a collar of a pliable cardboard. Do not wait until you see the pests as they hide under the soil by day and do their damage mostly at night.

Royal Horticultural Society

▲ *Gray speckled leaves mean red spider mite; silken webbing is another sign.*

Root-knot nematodes (eelworms): these microscopic pests cause irregular swellings on roots of plants, resulting in yellowing of leaves and stunting of plant growth. They are more common and durable in warm areas amd sandy soils and thus are a major problem in the South. Severely infected plants must be removed and destroyed. Treatment of soil before planting helps to control.

Leaf hoppers: yellowing of foliage or edges becoming brown can often be traced to these ⅛ in (0.3 cm) wedge-shaped insects. They collect on undersides of leaves, suck the sap and spread aster yellows, a virus disease that stunts growth. Early destruction of infected plants is important to keep the disease from spreading to healthy plants nearby. Leaf hoppers should be knocked from plants with a strong stream of water from a hose. Apply a recommended insecticide to control severe infestations.

Red spider mite: this is a problem you are likely to encounter with eggplants, particularly those grown under glass, or when the weather is hot and dry outdoors. The main symptoms of red spider mite infestation are leaves turning speckled gray-green and then bronze. If the infestation is severe, the leaves will wither and fall prematurely. Another indication of red spider mite is fine silken webbing covering the leaves and sometimes the stems. Spray the leaf undersides with a hard stream of water, or spray with an approved miticide.

Slugs: these familiar garden pests attack a wide variety of plants, ornamental as well as vegetable. They feed chiefly after dark, both above and below ground. The leaves, stems and low-hanging fruit can be attacked.

During the day they hide away in dark, moist cool places. Their favorite haunts are decaying vegetable matter, and soils rich in humus and moisture. Scatter a slug and cutworm bait on the soil in the evenings.

Trapping slugs is an effective method of ridding your garden of these pests, but it is time-consuming, and calls for daily inspection of traps. Use wet sacks or heaps of damp vegetable refuse, such as lettuce or cabbage leaves or orange peels, and place them at the base of the plants. Remove and destroy all trapped slugs daily.

Aphids: these small green insects are usually found in colonies on or near the

growing points, or under the young leaves. Infested leaves turn yellow or pale green, become distorted and wither, while infested growing points may die completely, so that the plants and/or side shoots stop growing and are stunted. Control aphids by sprays of malathion or rotenone.

Whitefly: these insects, which look like tiny white moths, are more trouble some years than others. They thrive in hot, dry weather, and whitefly attacks in these conditions can be ruinous. Like red spider mite, they live and feed on the undersides of leaves, where they suck the sap. The leaves become grayish green and wilt. They also exude honeydew and it is this which encourages secondary infection by sooty mold. Spray thoroughly with an insecticide approved for use in your area as soon as the first signs of whitefly appear, particularly the undersides of the leaves and again as the makers instruct. Repeated sprays are usually required to deal with immature whitefly missed by previous applications.

Colorado potato beetle: a high-crowned, striped, yellow beetle, winters in the soil as an adult. Orange-yellow eggs cluster on the undersides of the leaves and hatch into fat humpbacked grubs which attack the foliage. They also attack potatoes, tomatoes, peppers, petunias, nicotianas and other plants, producing one to three generations a year according to climate. Spray or dust with Sevin at first appearance. Late fall spading of the soil also helps. Other pests such as leaf hoppers, flea beetles, cucumber beetles and woolly bear caterpillars are also controlled by the same spray if present.

Botrytis (gray mold): this fungal infection is a very common garden problem, and attacks a wide range of fruits and vegetables. It is usually associated with cool, damp, overcrowded growing conditions. The symptoms of gray mold are fluffy, gray growths on the leaves, fruit and occasionally the stems. The disease enters the plant through a wound or through dead or dying tissue, and hence infection often occurs on the fruit where the blossom was joined to it. Because botrytis spores are constantly present in the air, poor growing conditions can quickly lead to a severe attack, and an entire crop can be ruined.

The best precautions are to ensure that seedlings and young plants are not overcrowded, and that air can circulate freely. If there is an outbreak of botrytis, remove and burn all infected leaves and fruitlets. Improve the growing conditions, by raising the temperature both night and day, giving more ventilation, and removing shading from glass, if previously applied. Badly infected plants should be removed and destroyed, as it is unlikely they will recover.

GUIDE TO EGGPLANT TROUBLES

Symptoms	*Probable cause*
Leaves pale, speckled, wither and fall prematurely, webbing present	Red spider mite
Irregular holes in leaves and stems, silvery trails near plants	Slugs
Leaves pale green or mottled, distorted; small green insects on underside	Aphids
Leaves gray-green, tending to wilt, small white flies that fly up when disturbed, black patches and stickiness on leaves	Whitefly
Leaves, fruits and stems with patches of gray furry growth	Botrytis
Fat, striped yellow beetles or fat humpbacked grubs that chew the leaves.	Colorado potato beetle

growing ideas

Choose Endive for Salad Greens

Crisp and crunchy endive is one of the tastiest of all winter salads. It is easy to grow in any garden.

Forget that rather bitter-tasting endive you got from the supermarket—really fresh endive is sweet and crunchy, and you can only get quality like this when it is fresh from your garden. The secret of growing the best endive is blanching. Unfortunately, much of the endive offered for sale has been insufficiently blanched by the grower, or it has lost most of its blanch during the journey to market. When properly treated, endive is a delicious vegetable, and one that is quite easy to grow.

There are two different types of endive. The curly-leaved, or staghorn, types can be sown in early spring for a summer crop, and they are usually sown in early summer for an autumn crop. The round-leaved, Batavian type is hardier and can tolerate light frost. Sow it in midsummer for fresh salads in late autumn and early winter. Cold frame cultivation can extend the harvesting period for both types.

Soil which is light and well-drained is ideal for endive. Of all the vegetables,

Brian Furner

Batavian, broad-leaved endive; this type is slightly hardier than the curly varieties and can be harvested later.

Brian Furner

➤ *Pot-grown curly green endive. It is well worth trying this salad crop in containers as well as outdoors.*

endive appreciates a humus-enriched soil, although it will grow on heavier land if you are willing to put in a bit more effort. A plot of ground which has been manured for a previous crop is the best choice. Ideally the site should be in dappled sunlight, fairly sheltered. In spring, work in handfuls of peat or leafmold. About a week before sowing, mix in a complete fertilizer at the rate of 2 oz per sq yd (60 g per sq m).

To sow endive, take out V-shaped drills about ½ in (1.3 cm) deep and 15 in (37.5 cm) apart. Sow the seed very thinly. It is a good idea to make several sowings, say, every two weeks beginning in early spring, so you have heads for cutting over a longer period, instead of a glut at any one time. Endive thrives best in firm soil, so tread the drills or compact them with the back of a spade just after sowing. Endive germinates quickly, usually in about three days; if it takes very much longer it is wise to re-sow, as the crop is likely to run to seed.

When the seedlings are large enough to handle, thin to a spacing of about 1 ft (30 cm) apart. Early thinnings can be transplanted, but this is not advisable with plants which are too large, as the risk of failure with transplants is high.

Endive is one of those plants which is prone to bolt, particularly in hot, dry conditions. Also, the leaves toughen rapidly if the roots become dry, so the plants should always be watered liberally. If your soil is light, a mulch of peat or garden compost applied during hot weather will help to retain moisture.

When the plants are about halfway to maturity, usually about six to eight weeks after sowing, feed with a weak solution of liquid fertilizer or manure water every seven to ten days.

Blanching is the most important part of growing endive. You can begin blanching as soon as the plants are fully grown, when they are about 1 ft (30 cm) across. It is important to remember that blanching can be carried out only when the plants are thoroughly dry. If you start to blanch while the leaves are wet, the endive will quickly rot and die. Cover your plants with protective covers

a few days before blanching is to begin, as this will allow the leaves time to dry off completely. Covered cultivation is necessary for later-sown plants anyway, particularly for the curly-leaved varieties which suffer from frost if left in the open.

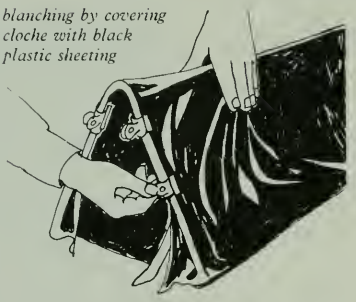
If you want to blanch only the heart and center leaves of the endive, simply place a plate or saucer over the top of each plant, and leave it there for between two and three weeks. The covered plants should remain under tunnels or cloches. This method works best for the curly-leaved varieties, which are rather flat.

Winter-maturing Batavian types need to be kept in the dark for about four to six weeks to blanch successfully. The most convenient method of blanching their inner leaves is to gather up the outside leaves and tie them together at the top so that light cannot reach the center of the plant, using raffia or rubber bands.

To blanch the entire head of endive, cover each head with a terracotta flower

blanching by covering with a pot

pot. Remember to cover over the drainage hole or stop it up with putty so that the plant is in total darkness. Another method is to leave the plants under tunnel cloches, and to cover them with black plastic sheeting. Blanching the heads by either method should take between 10 and 20 days. It is a good idea to check the plants after 10 days, as they can always be re-covered if blanching is not complete. However, if the plants are



blanching by covering cloche with black plastic sheeting

left in the ground too long after they are blanched, it can lead to heart rot.

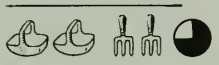
To harvest endive after blanching, choose a dry day and use a sharp knife to cut close to the bottom leaves. Do not pull it up by the roots, as this will scatter soil over nearby plants, and may ruin them.

It is also possible to blanch endive after lifting it, and you may want to do this if the weather suddenly turns very cold. This applies to the Batavian sort. Lift the whole plants and "transplant" them into boxes of soil. They can be quite closely packed. Keep the box in a dark place until the endive is blanched. Remember that this will lead to a glut of plants being ready at the same time, so be prepared to give some away to friends or neighbors.

Endive is at its crispest and tastiest when eaten fresh from the garden. It does not store well. Use it for delicious winter salads, or braise it gently as an interesting change from the usual cooked greens. Since endive tolerates high temperatures, it flourishes in midsummer when it is too hot for lettuce to grow.

Like all leafy vegetables, endive is highly prone to damage by slugs. Keep a lookout for these pests, and scatter slug pellets if necessary. Caterpillars can attack the leaves, and you may need to spray with a non-poisonous insecticide such as Sevin. Fortunately, endive is relatively disease-free; the only problem might be mildew, so keep a lookout for this.

Figs



Ficus carica (fam. *Moraceae*)
Hardy deciduous tree, with a very long life
Size: bush trees 10–12 ft high by 15 ft wide (3–3.6 m × 4.5 m); fan-trained trees 10 × 15 ft (3 × 4.5 m)
Yield: 13 lb (6 kg) for a single crop on an outdoor fan or bush tree, up to twice this on a greenhouse tree; about 25 fruits on a 4 ft (1.2 m) pot-grown tree

The ancient and venerable fig is not as delicate as is often imagined, and can be quite easily grown in sheltered spots in temperate climates. Frequently it is grown fan-trained against a wall. Unlike grapes, or most other fruit trees, once planted, it requires little attention apart from watering; pruning largely being restricted to cutting back several shoots each year.

Nevertheless, frost is the major problem with growing figs. Although the tree is surprisingly hardy while dormant in the winter—it can survive temperatures as low as 14° F (−10° C)—a sudden frost after it has started into growth in the spring can kill whole branches. Do not worry unduly about this, however. Figs are very rarely killed outright by frost and usually new growth will grow up from suckers from the roots.

Although figs are most widely grown (and crop most heavily) in warm temperate regions, particularly in the Middle East and California, in one way figs grown in cold temperate climates are better. The varieties most commonly grown in the Middle East contain seeds and must be pollinated by the fig wasp which lives on wild figs (caprifigs) and can only live in warm climates. The fig is a botanical curiosity because its flowers are contained *inside* the skin of the fruit and only the fig wasp can enter the small opening in the skin to pollinate them. The varieties grown in cold temperate climates, however, are of another type which produces fruit without pollination. Hence they are seedless and make a sweeter, more delectable dessert than seeded figs. A fresh, seedless, thin-skinned fig is far superior to the dried figs which, because the fig is too delicate to travel well, are all that can be obtained from stores.

Suitable site and soil

Although the fig is not delicate, neither is it completely hardy. Except in the milder areas, it can be grown outdoors in temperate regions only if it is horizontally- or fan-trained and is given the protection of a wall. Ideally, the wall should be 8 ft (2.4 m) high and about 15 ft (4.5 m) long. South, southwest and southeast facing walls are all suitable, but east is best. Al-

ternatively, the trees can be grown in a greenhouse, either against a wall or as a bush.

Bush trees outdoors are more delicate than fan trees and need a warm sheltered spot, such as the angle of two walls.

The fig has two important soil requirements. It needs a lime-rich soil and its roots must be restricted. Test your soil with a soil test kit and add enough lime to give a pH of 7–7.5. Dig the lime deeply into the soil. In addition, add 2 oz (60 g) of bonemeal two weeks before planting. If you are planting in a pit, use a good loam to which lime and bonemeal have been added.

There are two ways of restricting the roots of figs. The simpler way to begin with, but the harder from then on, is to rely on root pruning. This may well be adequate if you have a shallow soil which will prevent the roots growing deeply. On most soils, however, you are better advised to restrict the roots by preparing a lined soil pit or by planting the tree in a pot.

Planting

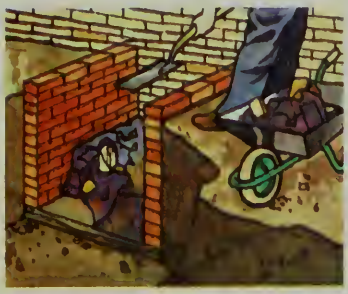
Prepare a soil pit by digging a hole about 3 ft (90 cm) square and 3 ft (90 cm) deep. Fill the bottom with 1 ft (30 cm) of broken bricks, crocks or rubble to allow drainage and place this drainage material on top of a concrete base about 2 in (5 cm) thick. Then line the sides of the pit with brick or concrete.

It is a good idea to make the walls a few inches higher than the soil surface so that watering is made easier and surface roots cannot escape out over the walls.

Donald Smith

▲ *Figs given the protection of a wall usually grow and crop well.*

PLANTING



1. Dig a pit 3 ft (90 cm) square and 3 ft (90 cm) deep. Fill with 2 in (5 cm) concrete and 1 ft (30 cm) of rubble.

2. Plant the tree, spreading the roots out well. Before planting, erect horizontal training wires.

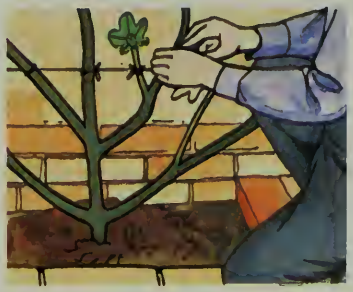
3. Water the young tree well and apply a mulch of rotted manure to conserve moisture.

Plant the tree in early spring. Most nurseries will supply the young trees in containers. Put sufficient prepared soil in the base of the pit so that when planting is completed the soil mark on the trunk of the tree is at the same level as that of the surrounding soil. Remove the tree from its container, and plant it in the pit, spreading the roots out well and returning the soil around them as you would for other fruit trees. Firm the soil down well while you are returning it to the pit. If planting more than one tree, allow 12 ft (3.6 m) between plants not grown in lined pits.

Figs need a good deal of water and against a wall it is often very dry, so water the newly planted tree generously. In addition, if you have any available, add a mulch of rotted garden manure or moist peat to retain moisture.

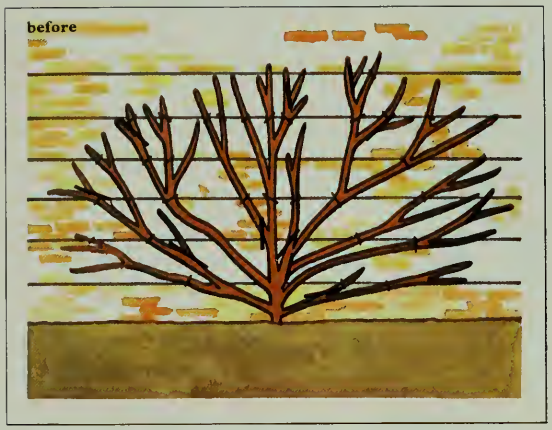
Training and pruning

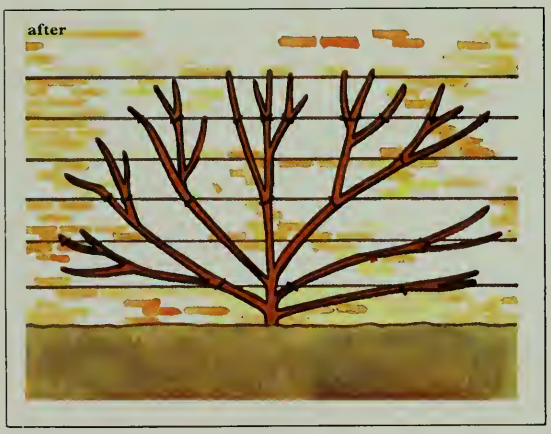
Training a fan-shaped fig is not difficult. Some time before planting, fix horizontal training wires to the wall behind where the tree will be, at roughly 1 ft (30 cm) intervals. Use nails or vine eyes to support the wire. Then, a few weeks after planting, tie in the shoots of the tree to the wires, loosely spreading them in the shape of a fan with about 12–15 in (30–37.5 cm) between each shoot. Figs grow better if they are not too strictly trained, so in the first summer let the tree



4. A few weeks after planting, tie the young fig to the training wires. Tie in new growth as it appears.

PRUNING





Prune figs in early spring. Cut back damaged and badly spaced shoots to a basal bud. In addition, prune a third to a half of the old branches right back to the base to encourage new growth.

grow at will, simply tying in new growth as it develops. In the autumn, however, after the leaves have fallen, cut out all congested shoots and those growing into the wall.

A fan-trained tree will take about two to three years to fill its allotted space. In the second and third years, tie in well-spaced new growth but cut out all badly spaced growth and any shoots growing in the wrong direction. Do this in midsummer. Try to produce an evenly spaced fan with no overlapping branches. All the leaves and fruit should receive some direct sunlight and not be shaded by each other, so space and prune them accordingly.

As the fig only produces fruit on one- and two-year-old wood—older wood becomes naked with neither fruit nor

leaf—pruning in subsequent years is to encourage the growth of new shoots.

Although pruning can be done in late autumn or winter, it is usual to leave pruning until early spring, when any frost damaged or diseased shoots can be recognized. Cut out these damaged shoots, as well as all badly spaced shoots, to a basal bud on a main branch. In addition, cut a third to a half of the oldest branches right back leaving only a few buds at the base. Select old branches bearing little or no embryo fruit for removal. New growth produced from the basal buds should bear fruit and should be tied to the wires as necessary.

Any surplus sideshoots produced during the summer should be pinched out as soon as they develop.

Bush trees are even easier to prune than fan-trained trees. The fig conveniently tends to grow as a fairly well-shaped bush of its own accord. Nevertheless, fairly soon after planting, in midspring, prune the leading branches back by about two-thirds to encourage stronger growth. In subsequent springs simply prune out dead, overcrowding and badly spaced branches, and cut the longest branch or two back to a few buds at its base to stimulate new growth.

Root pruning vigorous trees

If you have planted the tree directly into the soil, instead of in a soil pit, you are likely to get a too vigorous tree which grows strongly but produces little fruit. This is the result of unrestrained root growth and to produce fruit you must drastically prune the roots. Do this after leaf fall in the autumn. Dig out the soil in a circle about 2 ft (60 cm) from the tree trunk and cut all the large roots which cross this circle with a sharp spade or pruning shears. Then fill in the hole but do not put back the soil which you have dug out. Instead, fill the hole with rubble to discourage the roots from growing through.

Watering

Figs require little watering until growth starts in the spring, but give them a good soaking then, especially if the spring is a dry one. Thereafter, until the fruit begins to ripen, water heavily, about every four days in dry, hot weather or if the soil is a shallow one; otherwise, once a week will be sufficient. However, once the fruit begins to color, gradually decrease the frequency with which you water, although you should not let the soil dry out. It is important that you give sufficient water to maintain growth. After harvesting you can stop watering them altogether. Normal summer rainfall in eastern states gives figs enough water, but in case of drought the trees should be soaked every week or ten days.

Fertilizing and mulching

In the second and following years, feed the tree with a good, balanced complete fertilizer at the rate of 2 oz per sq yd (60 g per sq m) over the area to which the roots extend. Apply this in late winter or early spring. If you have a particularly well-drained soil, you should also add a second dressing in early autumn.

Put down a mulch of well-rotted manure, garden compost, or moist peat in late spring to help retain moisture. It can alternatively be put on in early autumn after the second fertilizer dressing (if added) and the remains of it lightly forked in at the end of the winter.

Disbudding

In their natural habitat, in warm Mediterranean-type climates, the fig produces two or even three crops per year. Outdoors in cooler climates, however, you will only get one. A second crop begins to form but does not get time to ripen.

The fruit is borne at the tips of the shoots on one- or two-year-old wood. If you look at a shoot in the autumn, you will see large fruits on the two-year-old wood at the base of the tip (these are the season's crop and should be left). Beyond these are smaller, slightly developed fruits on the one-year-old wood, and beyond that tiny embryo fruits, hardly recognizable as figs at all. These embryo fruits are the next year's crop and should also be left. The slightly de-

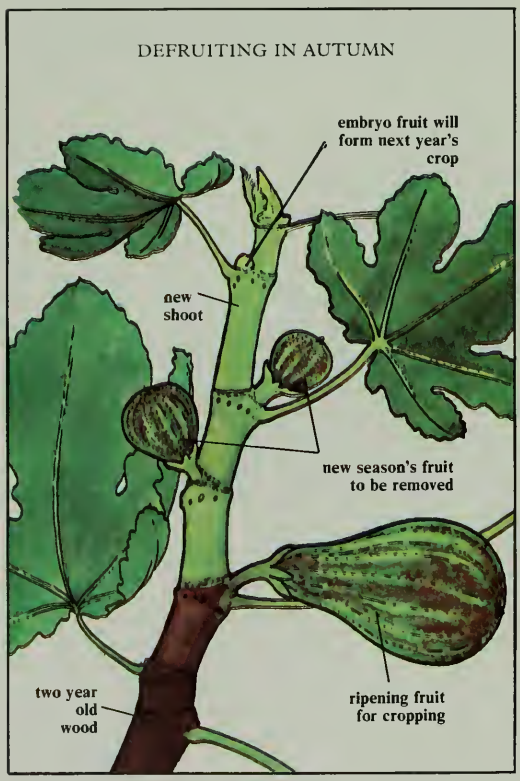
veloped fruit on the one-year-old wood, however, which would have produced another crop in warmer climates, will never develop to maturity outdoors in temperate climates. Instead they will be killed by the winter frosts and may be removed in the autumn. Their removal stimulates the production of embryo fruits which can survive the winter to form next year's crop.

Harvesting and storing

The best-flavored figs are allowed to ripen on the tree. When they are fully ripe they droop and crack slightly, producing a small drop of moisture at the

Brian Furner

▲ *The small fruit on the young (green) growth of this shoot should be removed.*


DEFRUITING IN AUTUMN
embryo fruit will form next year's crop
new shoot
new season's fruit to be removed
two year old wood
ripening fruit for cropping

When harvesting outdoor figs, also pick any fruits which are recognizable as a fig but are not mature and discard them. They will never mature outdoors. The embryo fruit buds at the tip, however, should be left. They will form next year's crop.

"eye" at the base of the fruit opposite the stalk.

Pick them carefully—a ripe fig is thin-skinned and delicate. Try to handle only the stalk to avoid bruising.

Figs are most delicious when eaten immediately after picking but, if your tree produces too many for you to cope with all at once, you can preserve them in syrup. Skin them first, if you prefer, then bottle them in syrup to which a teaspoon of citric acid per quart (liter) has been added.

Protecting against frost

Although figs can withstand quite severe frosts while they are dormant during the winter, if the temperature falls quickly the young shoots, and the embryo fruit buds in particular, may be damaged. To protect them, intertwine straw or boughs of spruce or bracken between the fig branches in early winter, removing them when frost danger has passed in early spring. Intertwining with spruce boughs is probably the best method. The spruce needles gradually fall during the winter, increasing the exposure of the fig as the spring progresses. Paper or burlap around branches can be used in colder areas.

Alternatively, you can take the tree down from the training wires, if it is fan-trained, and lay it on the ground in the early winter. It can then be covered with straw or sacking. This is the better and safer method to use in the North. Pot-grown trees, of course, can be brought indoors during the winter.

Propagation

Figs grow on their own roots without the need for a rootstock and can be propagated either from heeled cuttings or by layering. Take cuttings in early spring. They should be short-jointed, about 9 in (23 cm) long, and have been taken from shoots formed during the previous growing season. Insert about half the cutting into a peat/sand mixture, preferably with bottom heat. Fig cuttings root quite readily and you should be able to transplant them in early summer. Dig them up with as much root as possible and pot them into 6 in (15 cm) pots, and plant out in early summer.

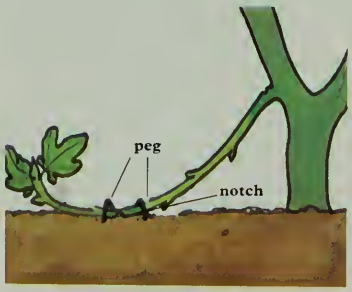
➤*Figs range widely in color from black, through brown to a pale greenish white; although perhaps the most luscious looking are a dark purple like those shown. Grow your own—you cannot buy their equal in the stores.*

Harry Smith

Harry Smith

Figs must be protected from sudden frost with hay, straw or spruce boughs.

Figs are probably more easily propagated by layering. Take a strong, young shoot and peg it down to the soil with the tip turned upward. Then put a notch in the stem where it touches the ground. There should be a bud or leaf joint opposite the notch, on the upper side of the stem. This notch stops the flow of sap and it is here that the roots will form.



To layer figs, peg a young shoot to the ground with a notch cut in it where it touches the soil.

The layers should have rooted sufficiently by the autumn for them to be severed and planted out separately from the parent tree.

Pot growing

Figs make excellent pot trees because the pot effectively restricts the roots. Obviously only a smallish tree, say up to 5 ft (1.5 m), can be produced in a pot, but if treated well it should produce a moderately heavy crop.

Use a 10–12 in (25–30 cm) pot and a fairly rich potting mixture. You can use a rich mixture as the roots are so confined in a pot. Fill the bottom with broken crocks to a depth of 1½ in (3.8 cm), half-fill the pot with the soil mix and then spread the roots out inside, using the handle of a trowel to firm the soil between the roots as you slowly fill up the pot.

Prune the tree in the same way as you would bush figs grown in the soil, but in addition pinch out the growing tip of the

POT GROWING

1. Pot the fig in a 10–12 in (25–30 cm) pot containing rich soil mixture. Fill the bottom with broken clay pots.

2. Spread the roots out well and firm the soil between them with the handle of a trowel.

3. Figs crop surprisingly heavily as pot trees. Pots effectively restrict their roots.

shoots after they have developed six to eight leaves in the early autumn. This will insure that the new wood ripens properly before the tree becomes dormant. Unripened wood is more likely to be damaged by frost.

As the roots of pot-grown trees are so confined they should be watered a little more frequently than soil-grown trees. You may need to give them a little additional food as well. If the crop is large, or if the tree has been watered heavily and fertilizer is likely to have been leached away, give an extra dressing of fertilizer in early summer as well as the one given in the spring. For this second dressing, use a good balanced fertilizer at a rate of 1 oz (30 g) per pot with a second application three weeks later. Alternatively, you can just add extra soil mixture. Place it around the edge of the pot but not next to the tree trunk, so that the trunk lies in a small depression.

Greenhouse growing

If you have a greenhouse with sufficient heating, you should be able to get two crops per year. (With a lot of heat and care it is possible to get three crops but the effort is hardly worthwhile; while in an unheated greenhouse you will probably manage only one.) The first crop, obtained from the embryo buds produced in the autumn, should be ready for picking in early summer; the second

crop, produced from the current season's growth (the small fruits which would be removed in outdoor growing), should be ready in early to midautumn.

Start the plants growing in late winter. Heat up the greenhouse, not letting the temperature fall below 50° F (10° C), water the plants and damp down to keep the greenhouse humid. Once the leaves have started to unfold syringe them daily until they are fully open.

Figs like it hot—up to 91° F (33° C)—although the greenhouse should not be allowed to become muggy. Fully open the ventilators in the hottest days in summer and then close them down again before dusk to retain warmth for the night if it turns cool.

As far as pruning is concerned, treat greenhouse figs in the same way as outdoor figs, although you should not disbud them in the autumn. You should also water more frequently—twice daily watering may be necessary in hot weather—but reduce your watering to half while the first crop is ripening. In addition, as the tree is producing more fruit than an outdoor fig, you should give it more food. Top-dress with garden compost or rotted manure in early spring and feed weekly with liquid manure once the fruit has begun to swell. Finally keep the soil moist through the winter.

To get the best crops, you should reduce your watering and feeding while the fruit is ripening; but remember that while the first crop is maturing, the second is still only in the embryo stage. When the fruit begins to change color, indicating that it is ripening, reduce watering but do not let the soil dry out. Stop feeding altogether. Then resume normal feeding and watering as soon as the first crop has been picked. Finally, once again, reduce watering and stop feeding when the second crop begins to mature.

Exhibition tips

Exhibit figs when they are fully ripe. Six fruits are the usual number and you should aim for well-colored, large, uniform, fruits with an undamaged bloom. To make sure of this, handle them only by the stalk when picking, and transport them carefully, protecting them with tissue paper. Splitting, however, is a sign of ripeness and is not a fault.

Pick the figs as late as possible before the show. When you get there, place them neatly on a plate or in a basket. They look particularly attractive if they are displayed on a bed of their own leaves in a basket.

Pests & Diseases

Although figs suffer from some of the common fruit tree troubles, they are generally pest- and disease-free. Frost damage is a far greater problem.

Scale insects: this is the most common fig pest. The small brown insects, which are about 1/16 in (2 mm) long, suck the sap from the stems and leaves; they are usually to be found on the under surface of the latter, close to the main vein. Scale insects are often also associated with a black, sooty mold which grows on the sticky substance (honeydew) that the insects secrete. As soon as they are seen, spray the tree thoroughly with malathion, repeating perhaps twice more at 10-day intervals.

Red spider mite: speckled, yellow or gray/green leaves, sometimes with fine webbing on their undersides, are a symptom of the attack of this common pest. With a hand lens you can see the small, pale red insects on the undersides of the leaves. In severe cases the leaves wither and fall. Red spider mites are more of a problem in dry, hot weather and they dislike damp conditions. To prevent their appearance, spray the tree with a strong stream of water, especially in dry weather.

Mealy bug: mealy bugs feed in a similar way to red spider mites. They are small buglike insects which are coated with a white or gray fluffy substance and live on the bark and leaves, sucking the sap of

the plant. The best cure is to spray the plant with rotenone or Sevin; but use a wetting agent or the spray will not be able to penetrate the fluff of the insect, as this has a waxy coating.

Coral spot: this fungus enters the tree through wounds and, having done so, can then kill whole branches. It is easily recognized by the cushionlike mass of pinkish or reddish spores, but you will not see these until it is too late, after the branch is dead. Prevention is therefore better than cure. Cut out all dead wood every year and paint all wounds that are over ½ in (1.3 cm) diameter with a wound-sealing paint.

The reddish spots of coral spot.

Canker: another disease which enters the tree through untreated wounds is canker. It is most common in humid, airless greenhouses. The bark cracks and peels away, leaving deep gnarled wounds. In serious cases the branches may die. Pare off all diseased bark and, if badly damaged, cut completely back to healthy growth. Dress all wounds with a wound-sealing paint.

Mosaic: mosaic virus appears as yellow-green specks anywhere on the leaf surfaces of the fig tree or as pale green spots or bands near large leaf veins. Nevertheless, the leaves are never deformed and in cold temperate regions the disease is not serious.

Scale insects suck the sap of the plant.

GUIDE TO FIG TROUBLES

Symptoms	*Probable cause*
Bark and leaves covered with a sticky black substance, small brown insects on the stems or undersurfaces of leaves, particularly close to the main vein	Scale insects
Small buglike insects coated with a white or gray fluffy wax	Mealy bug
Speckled, yellow or gray/green leaves possibly with fine webbing on the undersurfaces, small pale red insects just visible with the naked eye	Red spider mite
Cushionlike mass of pink or reddish spores on dead branches	Coral spot
Yellow/green specks or pale green spots or bands on the leaves, particularly near large leaf veins	Mosaic
Bark cracked and peeled away leaving deep, gnarled wounds	Canker

Varieties

Black Mission: plump, blue-black; flesh reddish-amber. Hardy.
Brown Turkey: long, purple-brown, flesh strawberry-red. Popular in East and California.
Brunswick: very large, dark brown; inside pink. Fair quality, late.
Celeste: smallish fruits, purple; pulp white to rose. Early, hardy, good for canning and preserving.
Magnolia: large, amber; pinkish amber inside. A favorite in southern Texas.
Kadota: the light green fig often seen in jars; fruit medium-sized, sweet, juicy.

Other varieties
White Marseilles: not as hardy as Brown Turkey or Brunswick and should be grown in milder climates only or in greenhouses; large pale green fruit with white flesh; rich sweet flavor.
Negro Largo: heavy cropper; fruit large with black tender skin and juicy with red flesh; sweet flavor; needs heated greenhouse for it to reach full potential.
Bourjassotte Grise (Grizzly Bourjassotte): suitable for greenhouse; medium to large fruit; dark reddish-blue skin with fine bloom; excellent flavor.

Also Mission, Adriatic, Ronde Noire, Texas Everbearing and White Italian.

Pat Brindley

▲ Brown Turkey

Bernard Alfieri

▲ Brunswick

G E Hyde

▲ Magnolia (young)

Brian Furner

▲ Black Mission

step-by-step growing guide

Gooseberries

Ribes grossularia (fam. *Grossulariaceae*)
Hardy deciduous shrub with a useful life of 12 to 20 years
Size: 3 ft (1 m) high; 4–5 ft (1.2–1.5 m) wide
Planting to harvesting time: 2–3 years
Yield: 8–15 lb (3.5–7 kg) per bush and more

Gooseberries are easy to grow and are probably the best soft fruit for a small garden where white pine trees do not grow. Like currants, they should not be grown in such regions because of the pine blister rust they are believed to transmit. Their cultivation needs are moderate, they give a large amount of fruit for the area they cover, and a well-tended bush will go on cropping for twenty years or more. Three or four gooseberry bushes will be ample to supply the needs of most households. However, gooseberries are self-fertile, so you can grow a single bush in your garden with good results. Gooseberries are very tolerant of exposure and are occasionally grown as windbreaks to protect less hardy crops, though strong winds at flowering time will discourage pollinating insects. They are more shade tolerant than other soft fruits, so gooseberries will thrive in town gardens where other soft fruits fail.

There are a number of varieties of gooseberry available; if you plant several bushes you can extend the season of cropping from early summer through to early autumn. Gooseberries are usually first picked when the fruits are small and green. These unripe thinnings are cooked and served in pies or puddings or preserved for future use. Ripe gooseberries are highly valued as a dessert fruit, and are delicious when eaten raw. First class dessert gooseberries are seldom seen in shops, so it would be well worthwhile for the amateur gardener to have at least one bush in the garden. Ripe dessert gooseberries can be yellow, white, green or red. The Worcesterberry, a gooseberry hybrid and not, as often thought, a cross between a gooseberry and a black currant, has fairly small, blue-black, gooseberrylike fruit, and it is cultivated in the same way.

Gooseberries are usually grown as spiny shrubs on a single short stem like a tiny tree, although cordons, espaliers and standards are possible. A gooseberry grown as a standard is particularly suitable for planting in pots if you have a paved terrace, courtyard or balcony. They make attractive features and will carry good crops if properly cared for.

Suitable site and soil

The best soil for gooseberries is a well-drained loam containing plenty of potash and nitrogen; gooseberries, more than other soft fruits, are very particular about soil conditions. Generally, light

PREPARATION AND PLANTING

1. Dig in well-rotted manure, leafmold, garden compost or moist peat. Make sure all weeds are removed.

2. Plant in early spring, in a hole about 2 ft (60 cm) in diameter. Spread the roots out and replace soil firmly.

3. Firm in the soil around the bush, but do not compact it too much or rain will lie on the surface.

soils or sandy gravel are not suitable because they lack nutrients and tend to dry out in hot weather. Shallow limestone soils are unsuitable because they heat up in the summer, and gooseberries need a cool moist root run. Whatever the soil, it must be moisture retentive because the fruits will not swell if moisture is lacking. If the soil is too rich and fertile, however, sappy weak growth and poor crops will result. Some varieties of gooseberry are more tolerant of difficult soil conditions than others.

When selecting a site, much depends on the general geographic location. The best flavored gooseberries are grown in cooler areas. This is because the berries are less liable to be ripened prematurely by hot sun and they have time to mature slowly.

Some varieties are shade tolerant. Rows of gooseberry bushes are sometimes grown between young apple trees; and are dug up after 15–20 years, when the trees are reaching maturity. Gooseberries, like red currants, can be grown against north-facing walls and fences in gardens where space is limited. Cordons are the best shape to grow against fences or on their own as a boundary between gardens.

Generally, a sunny site will give a better flavored crop. In full sun, gooseberries should be grown as bushes so the branches help shade the fruit hanging beneath.

Avoid windy sites, because cold winds may prevent insects from pollinating them in early spring. Gooseberries are hardier than plums, apples and pears, and they will probably produce a moderate crop even if the flowers have been frosted. A frost-free site is better, though.

The site must be well drained, because gooseberries will not tolerate any waterlogging. Avoid low-lying sites on heavy soil because they tend to be badly drained and form frost pockets in winter.

Soil preparation and planting

Gooseberries fruit on both old and new wood, so it is important that the plant makes good strong annual growth. The

A-Z Collection

▲ *Gooseberries are best protected from attacks by birds if they are grown in fruit cages.*

best way to ensure this is by preparing the soil adequately prior to planting. Ideally, the soil should have been under cultivation for several seasons; if the site is newly cultivated, it is best to double-dig it.

For all soil types, dig into the top spit well-rotted farmyard manure or garden compost, moist peat or leafmold, remembering that the peat does not have any nutrient value. Light soils will then be made more moisture retentive, heavier soils more friable. Also apply sulfate of potash at this time, at the rate of ¾ oz per sq yd (25 g per sq m), forking it lightly into the soil. Make sure the area is completely weed-free. Once couch grass, bindweed or docks grow up into a gooseberry bush they are almost impossible to eradicate.

If you are buying gooseberry bushes, make sure they come from a reputable source; try to get two- or three-year-old bushes.

The best time to plant gooseberries is in early spring, so that the bushes have plenty of time to settle down and become established before making growth. If you are planting more than one bush, the distance between planting depends on the variety and the shape grown. Normally, strong growing bushes should be planted 6 ft (1.8 m) apart. Less vigorous varieties can be planted 5 ft (1.5 m) apart. Single cordons should be 1 ft (30 cm) apart; double and triple cordons and

Marshall Cavendish Clay Perry

➤*A standard gooseberry is very easy to train and makes an attractive feature in the garden. It is also suitable for growing in a large pot if you have a paved terrace, courtyard or balcony.*

espalier-trained gooseberries should be about 3 ft (90 cm) apart. If you are planting more than one row, leave at least 8 ft (2.4 m) between rows.

Before planting, remove all buds and suckers below the main shoots. If there are any suckers on the roots, take these off also. Gooseberries are usually grown on a single leg (clear stem) about 6 in (15 cm) high. You may have to trim off the topmost roots (very carefully) and plant the bush a little higher than the nursery soil mark, to get a good leg. This also helps keep down suckering.

Plant the bushes firmly, and not too deeply. Do not compact the soil too much, or rain will lie in puddles on the surface. Trained specimens should be staked when they are planted. Standard gooseberries will need strong stakes at least 4 ft (1.2 m) tall.

Cultivation

Gooseberries benefit greatly from feeding and mulching annually; greater yields will result if you follow these routines.

In spring or late summer, apply well-

rotted garden compost, at the rate of one barrowload per 11 sq yd (10 sq m). This encourages the formation of fibrous feeding roots, and increases crop production. Mulching also helps to keep weeds down and conserve soil moisture.

Because gooseberries need more potash than other soft fruits, they should have an annual application of sulfate of potash at the rate of ¾–1 oz per sq yd (20–30 g per sq m). This should be done in late winter or early spring, but if the edges of the leaves look scorched, brown and fall prematurely the plant is suffering from potash deficiency—apply sulfate of potash at the higher of the above rates immediately and water in. Sandy and gravelly soils are usually deficient in potash, so make sure you apply a potash fertilizer regularly. Ashes from the bonfire contain potash, and a mulch of these can provide additional potash.

Nitrogen is also necessary, to promote strong growth. However, if too much nitrogen is applied, sappy weak growth will result, with an increased risk of mildew. Usually, a mulch of garden compost in spring is sufficient. Every third year apply a dressing of superphosphate at the rate of 3–4 oz per sq yd (90–120 g per sq m) with the potash.

In winter check the plants frequently; firm down any lifted by frost. To reduce the risk of damage by frost where the danger exists, cover the gooseberry bushes in early and midspring with muslin or fine netting.

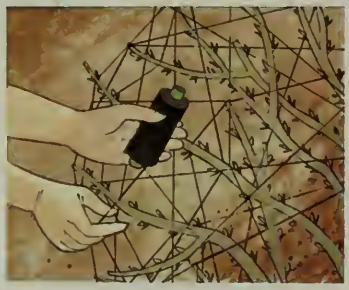
Birds tend to peck the buds out from late autumn to late winter. If the fruits are not grown in cages, the best method of protection is winding black cotton thread around the shoots and branches after leaf fall. If your garden is very vulnerable to bird damage, it is best to delay pruning until bud-break in spring. In early spring, when bud-break occurs, and you find that a shoot or shoots have been largely stripped of buds, cut them right back to the first strong bud near the base of the shoot; a badly stripped shoot will not recover.

Watering is necessary in dry weather, otherwise the fruit will not swell and the

CULTIVATION AND CARE

1. Each year in late winter or early spring apply sulfate of potash before mulching, and rake it in.

2. Mulch annually with well-rotted manure or compost to encourage the formation of fibrous feeding roots.



3. If birds are a problem, entwine black cotton thread through the branches as a deterrent.

leaves may scorch. This is particularly important for sandy or other very free-draining soils.

Water the plants at the rate of 4½ gal per sq yd (20 L per sq m).

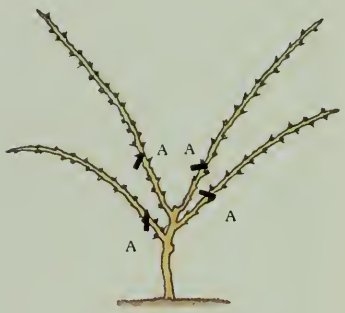
If you removed all the weeds before the bushes were planted, you should have little trouble with weeds later. Should weeding be necessary, however, hand-weed or hoe lightly. Never dig between the bushes or hoe deeply because you may damage the fibrous surface feeding roots. Mulching is a good way of keeping weeds down. Watch for seeding in the middle of the bushes, particularly of brambles.

Check for suckers growing up from the roots and carefully cut off any you find. If the suckers are left, the bush will lose its shape and be difficult to pick from.

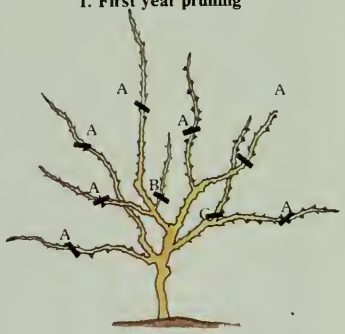
Pruning

Gooseberries can be trained into a number of shapes. Although the bush form is the most commonly seen, gooseberries can be grown as single, double or triple cordons, as espaliers and as standards, and even as fans. It is quite easy to train a standard yourself. Remove all but one strong straight shoot from a new bush and train it vertically until it has reached about 4 ft (1.2 m). Remove all the lower sideshoots from the stem, leaving the top four or five buds to form the branching head of the gooseberry, which is then pruned as though it were an ordinary bush.

Cordon trained gooseberries are particularly suitable for growing in rows against a wall or where room is scarce. Single cordons are trained by cutting back all sideshoots to leave one bud only on each, and cutting the leader back each year to leave about 6 in (15 cm) of new growth until the desired height is reached, about 5–6 ft (1.5–1.8 m). Then cut away the whole of any leading shoot each year, so that the spurs lower down continue to be strong. Double cordons are slightly more difficult. Begin by cutting back the main stem to leave two buds pointed in opposite directions,



1. First year pruning



2. Second year pruning

1. The first pruning consists of cutting back three or four strong shoots to an outward pointing bud, three or four buds from the base (A). Remove weak or badly placed buds.

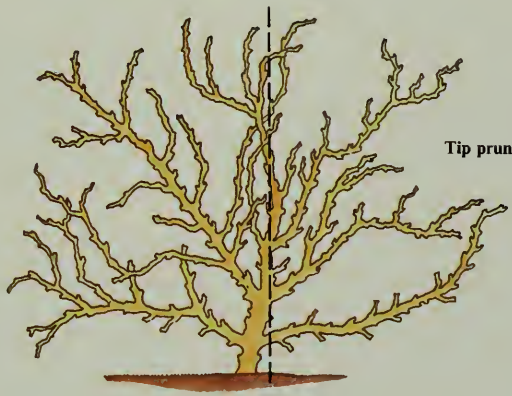
2. One year later, cut back 5–8 strong shoots to half their length, to an outward pointing bud (A). Shorten smaller sideshoots to one bud from the base (B); remove completely any weak or badly placed shoots (C). When pruning to form the framework of the bush, aim for an open-centered bush.

FORMATIVE AND MAINTENANCE BUSH PRUNING

Established gooseberry bush (unpruned)

Regulated pruning

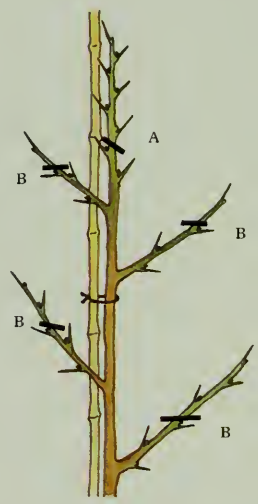
Tip pruning



Established gooseberry bush (pruned)

There are two methods of pruning an established bush; regulated and tip pruning. The former consists of removing overcrowded, weak and old wood, pruning branch leaders back by a quarter, and pruning one-year-old shoots to 3 in (7.5 cm). To spur prune, cut back all sideshoots to one or two buds, to encourage the formation of fruiting spurs. Spur pruning results in larger but fewer gooseberries.

about 9 in (23 cm) from the ground. Train the shoots which grow out from these buds at an angle of 45° at first, later gradually lowering them to the horizontal. Tie these horizontal shoots onto wires, and then cut them back to leave one bud on the upper side of each. These two buds will produce the vertical framework of the cordon. The formative pruning of specially trained forms is done in late winter at bud-break. The early pruning of gooseberry bushes is aimed at establishing a strong open framework able to carry a heavy crop. Once this framework has been formed, there are two methods of maintenance pruning. Tip pruning is done if you want a large quantity of berries, perhaps for freezing or canning, where perfection and size are not so important. If you want fewer but larger and higher quality berries for exhibition or dessert, spur pruning is the best method. Spur pruning is also recommended for bushes growing on light soils or where growth is poor.



Winter pruning consists of shortening the leading shoot to leave one third of its new growth (A), and pruning laterals back to three buds (B). Pruning laterals encourages the formation of fruiting spurs. In areas where bird damage to gooseberry buds is severe, prune in early spring.

Growing gooseberries in containers

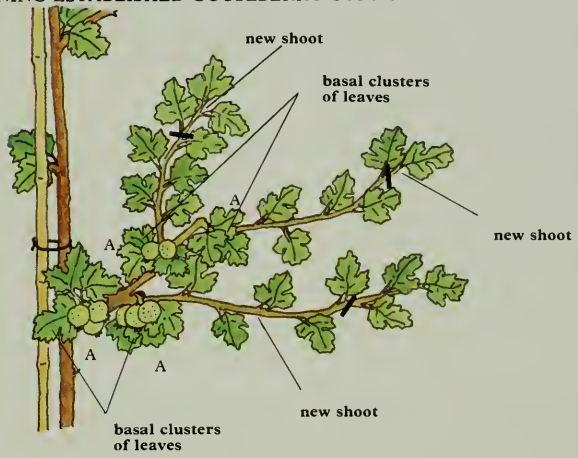
This method is suitable if you have a paved terrace or courtyard. Select a pot 12 in (30 cm) in diameter and 12 in (30 cm) deep to start with; as the plant grows on you will have to repot into a larger pot, say 14 × 14 in (35 × 35 cm). Line the bottom of the pot with a layer of drainage material, such as large stones or broken pieces of clay pots or brick. Then put in a layer of good loam mixed with an equal part of well-rotted garden compost, or use a good fibrous potting soil. Carefully spread the roots of the plant out over this layer, and fill the pot with more of the mixture until the top of the soil is 1 in (2.5 cm) beneath the rim of the pot. Water in well. Potting is best done in midautumn or early spring. Remember that plants in pots dry out very quickly in hot weather, so water the pots frequently—daily in very hot weather.

Do not feed the plant for the first year, as it is still becoming established. Thereafter, feed with liquid fertilizer when the fruits are swelling. If you live in a warm area or if your garden is fairly sheltered, you may be able to leave the pot outside all year round without protection. Otherwise plunge the pot in a sheltered border for the winter and mulch heavily, or put some form of lagging around the pot and over the soil surface to protect the roots from hard frost.

Propagation

There are three methods of propagating gooseberries: layering, cuttings and seeds. Layering is the easiest method, and probably the one most suited to the amateur gardener. Peg down suitably placed shoots in early summer and cover with a thin layer of soil about halfway along their length. By late autumn the

PRUNING ESTABLISHED GOOSEBERRY CORDONS



In midsummer, prune back laterals to 5 or 6 leaves, not counting the basal clusters (A). This pruning encourages the formation of fruit buds. As gooseberry mildew (the most serious gooseberry disease) appears first on the tips, tip pruning at this time helps to control the disease. If the cordon has reached the desired height, you can cut back the leading shoot during routine summer pruning. Sometimes, sucker-like shoots appear near the base of the cordons; cut these off cleanly as soon as they are seen, as they will drain the cordon of energy needed to produce the fruit.

rooted layer should be severed from the parent plant and moved to its permanent position. Unfortunately, bushes propagated by layering are less symmetrical than those raised by cuttings; they tend to sucker more, and it is difficult to get a clean leg.

The main problem with propagation by cuttings is that gooseberry cuttings do not root easily. If you try this method, prepare more cuttings than you need, as there will probably be some failures. If all the cuttings root successfully, you can share them with friends or neighbors.

One of the main reasons for failure of cuttings is the drying out of the cut end. Cuttings must not be left around while you prepare the site in which to root them; once the sap has dried the cutting will not root. Dig the trench beforehand in the autumn, selecting a warm and sheltered site. It should be V-shaped in section, and 9 in (23 cm) deep. If you are digging more than one trench, make them at least 2 ft (60 cm) apart. Then spread a 3 in (7.5 cm) layer of sand mixed with a little moist peat in the bottom of the trench.

Cuttings should be taken while some of the leaves are still on the bush; the earlier in autumn they are taken the better, provided the wood is ripe. Use only one-year-old shoots (these are lighter in color than old wood) about 10 in (25 cm) long; the shoots should be straight and thick but not sappy. Remove the top 1 in (2.5 cm) tip, cutting just above a leaf cluster or bud. The bottom cut should be

made just below a leaf cluster or bud. Rub off the lower buds leaving about four or five buds on the upper part of the shoot. Branches will develop from these buds, and the lower portion will form the leg.

Dip the bottom 2 in (5 cm) of the cutting in hormone rooting powder, and then insert the cutting firmly against one side of the trench so that about half the cutting is above the soil surface. Cuttings should be spaced 6 in (15 cm) apart. Press the soil sufficiently firmly around the cuttings so they do not feel loose when given a gentle tug, and make sure the soil does not dry out. Keep the ground well weeded. If you have extra protective covers available, it is a good idea to cover the cuttings during the worst of the winter months.

The following autumn, one year later, rub out any unwanted buds or suckers on the stem and roots and replant the rooted cutting in its permanent position.

If you do not mind waiting three or four seasons for the first fruit, gooseberries can be grown quite easily from seed. Sow seeds taken from a fully ripe berry in a ½ in (1.3 cm) deep furrow. Keep it weeded and well watered in dry weather. The following spring transplant them so they are 2 ft (60 cm) apart. If you have planted out more than one row, the rows should be at least 2 ft (60 cm) apart. The following spring transplant them out again, into their permanent positions. You will find that the seedlings vary greatly in quality; discard all but the best.

Harvesting

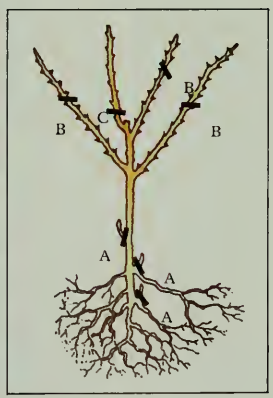
Harvesting is done in several stages; early thinnings are useful for tarts and jam-making, while the final crops of large, fully ripe fruit are usually eaten fresh. Start picking late in spring when the fruits are about the size of peas. Thinning at this stage leads to larger fruit later on. Because the colors of the different varieties do not appear until the fruits are nearly ripe, all thinnings at this stage will be green. Pick the berries off the bush with a quick jerk; in this way the fruit can be removed from the plant without damaging the spur.

The first picking should be done all over the bush, so that the remaining berries are evenly distributed. The thinned fruit should be at least 1½ in (3.8 cm) apart. The next picking should be done from the center of the bush and from lower branches. Fruits in these positions are unlikely to ripen completely, because of shading. The best placed fruits on the outer branches are then left on the bush to mature fully, and picked for dessert

PROPAGATING FROM CUTTINGS

1. Take cuttings of one-year-old shoots in autumn; plant immediately in trenches; space cuttings 6 in (15 cm) apart.

2. The next autumn, rub out any suckers (A) and cut back side-shoots by half (B). Cut off terminal shoot (C).



use when soft and ripe. To obtain the best flavor, pick these dessert gooseberries during the afternoon or early evening, while they are still warm from the sun. If possible, avoid picking while the weather is wet.

Exhibition tips

For exhibition work it is best to spur prune your bush to get good size fruits of the finest quality. When the fruits begin to set, apply weekly applications of manure water until just before the show date. If there has been a very heavy set of fruit, thin them after they have begun to swell.

Gooseberries, like other soft fruit, should be shown with a stalk still attached. Thirty berries is the usual number called for. They should all be of the same variety and as uniform in appearance and size as possible. Judging is divided into two categories: ripe and unripe gooseberries. Ripe fruits should be fully ripe and of good color; unripe fruits should be large and fresh.

Freezing tips

The successful gardener with an overflow crop can freeze gooseberries for future use. Select slightly underripe berries for making jam and fully ripe ones for desserts and making pies. Pack without sweetening those intended for preserves or pies; those for desserts in syrup.

Sort gooseberries to be frozen and remove stems and blossom ends. Wash berries carefully—preferably in a colander or wire salad basket to avoid bruising the delicate fruit. Do not use galvanized ware (iron or steel coated with rust-resistant zinc) when preparing any fruit as zinc is dissolved by fruit's natural acid and poisons the fruit.

For the unsweetened pack, just pour the washed and drained gooseberries into containers. For the syrup pack, cover berries in containers with a cold mixture of 4 parts water to 4¾ parts sugar (50 percent syrup). Leave head space according to size and type of containers used. Seal, label with contents and date and freeze at 0° F (−17.77° C).

Pests & Diseases

Gooseberries are relatively pest- and disease-free, given proper care. It is a good idea, if you have had insect trouble, to spray them with a dormant oil in winter. Do this when you spray plums and red currants. Then inspect your plants in spring and early summer for signs of attacks and spray or dust with pesticides in severe cases. Follow carefully the label directions whenever you do use a pesticide. This is for maximum effectiveness in controlling problems as well as protection for yourself, family and pets. Also, be sure to discontinue use of chemicals at the time prior to harvesting specified on the label.

Caterpillars: the caterpillars of the gooseberry sawfly can be destructive and in bad years can strip a plant of foliage. It is a particularly troublesome pest because there are several generations of sawfly in one season. For this reason it is important to completely kill off the first generation of caterpillars when they hatch out in spring. They eat small holes in the leaves; eventually the whole leaf is eaten except for the main veins and midrib. In mild attacks, pick them off by hand or spread out sacking beneath the bush and shake them out. If the attack is

G. E. Hyde

▲ *The caterpillars of the gooseberry sawfly can quickly strip a plant of all leaves.*

severe, hand-pick as much as possible as soon as the caterpillars appear, and then spray with rotenone or Sevin.

Gooseberry red spider mite: these do damage in the spring, when the weather is dry. They suck the sap from the undersurface of the leaves and are especially troublesome during warm, sunny springs. The leaves become pale or bronze-colored and may fall prematurely; any fruits which form will be small and unappetizing. In general the mites migrate to the bushes in spring from apple trees and buildings; spray just after flowering with Sevin or malathion to control them.

Birds: these are troublesome in some gardens; in winter they may peck out the dormant buds. If you cannot grow the bushes in fruit cages, twine cotton thread through the branches; alternatively, delay pruning until bud-break in spring. Bird repellant sprays can also be used.

Aphids: these tiny green "plant lice" infest the tips of the shoots and new leaves in spring, and can result in serious damage. The new shoots will cease to grow and be stunted and distorted; sideshoots may be produced lower down whose growth is weak. Remove the worst affected tips and spray at once with rotenone or Sevin, repeating if necessary. Remember not to spray during the day at flowering time.

Dieback: this is caused by the fungus *Botrytis cinerea,* or gray mold. The main sympton is the sudden death of a whole branch or branches, often in full leaf. If the fungus attacks the main stem, the whole plant may die. Infected leaves will turn yellow and then almost white along the margins; they later turn brown and wither. Infection usually enters the bush through a wound. Make sure you prune correctly and paint over large wounds with fungicidal paint. If the bush is only moderately infected, cut back into living wood and burn the infected branches. Also, wash hands and shears with alcohol. If a bush is badly infected, dig it up and burn it. Plants grown in poor soils are the most susceptible to fungus diseases, so take precautions.

Gooseberry mildew: this infection is probably the most serious gooseberry disease. The first symptoms are white powdery patches on the young leaves as they unfold, and on the young stems; later the fruits are infected, and at a later stage the patches of fungus turn brown and can be peeled off like thin felt. Infected berries remain small; infected shoots are stunted and twisted.

Donald Smith

These pale, powdery growths indicate gooseberry mildew.

Royal Horticultural Society, Wisley, Surrey

Leaves infected with leaf spot, a disease most likely to occur in wet summers.

GUIDE TO GOOSEBERRY TROUBLES

Symptoms	*Probable cause*
Small holes in leaves; later entire leaf eaten except for main veins and midrib	Gooseberry sawfly
Leaves pale, bronze colored, fall prematurely; fruits small, unappetizing	Gooseberry red spider mite
Dormant buds pecked out	Birds
New shoots stunted, distorted, weak sideshoots	Aphids
Sudden death of whole branch or branches, leaves brown and withered, fruits drop off	Dieback
White powdery patches on young leaves and stems, later turning brown; fruits small, unpleasant looking	Gooseberry mildew
Bright red or orange patches on leaves and stems, fruit; later cuplike growths on patches	Cluster cup rust
Small, black-dotted spots; leaves yellow, fall prematurely	Leaf spot
Leaf edges curl up, look scorched, rest of leaf green	Potash deficiency

Bushes grown in the open, and well pruned so that air can circulate freely around them, are less likely to be infected. As with dieback, avoid using too much nitrogenous fertilizer which encourages weak sappy growth. If the infection is mild, cut off and burn infected shoots as soon as seen. If your bushes have suffered attacks of European gooseberry mildew in previous summers, a good preventive measure is to spray the bushes with a mixture of washing soda and soft soap solution at the rate of 2 lb of washing soda and ½ lb of soft soap mixed with 10 gal of soft water (1 kg washing soda and ¼ kg soft soap mixed with 45 L water). If the water is hard, double the quantity of soft soap. Spray before the flowers open, again as the fruit is setting and thereafter at two-week intervals until it is controlled.

Cluster cup rust: this is another fungal disease likely to occur where bushes are grown in crowded or damp conditions. The main symptom is bright red or orange patches on the leaves, stems and fruits. Late in the summer, tiny cuplike growths develop on these red patches. All infected leaves, fruits and shoots should be burned. If your bushes have been infected with cluster cup rust before, spray them with an approved fungicide two weeks before flowering.

Leaf spot: black currants are more susceptible to this disease than gooseberries, although the latter are sometimes infected. It is most likely to occur in wet summers or areas which have high rainfall. The main symptoms are small, black-dotted spots; if the infection is severe, there will be large numbers of spots, the leaves will turn yellow and fall prematurely. Rake up and burn all fallen leaves and remove infected leaves from the bushes. If the attack is severe, spray with an approved fungicide after removing the infected leaves, and again two weeks later.

Potash deficiency: if the leaf edges develop brown bands around them, curl under and look scorched while the rest of the leaf remains green and the new growth is short, then the plant is suffering from a shortage of potash. A further symptom is small berries which remain unripe. Correct this by applying sulfate of potash at the rate of 1 oz per sq yd (30 g per sq m) immediately. Thereafter apply ¾–1 oz per sq yd (22–30 g per sq m) annually in early spring.

Scales: these plant-sucking insects can be controlled by a dormant oil spray in winter. It can be done at the same time that you spray red currants and plums. In spring and early summer, inspect the plants for signs of scale attack and spray or dust with pesticides in severe cases.

Varieties

Since gooseberries are not as commonly grown in the United States as most other small fruits, the selection of varieties is necessarily smaller.

Green varieties

Burgess Colossal: very large-fruited, prolific. Hardy, disease-resistant; commonly bear one year from planting.
Chautauqua: large, greenish-yellow on smallish bushes; fairly early.
Downing: fruits medium-sized. Productive; rather widely planted.

Red varieties

Fredonia: late with large dark red fruits.
Glendale: dull red, medium-sized fruits; plants vigorous. Stands heat better than most.
Pixwell: red when ripe, medium-sized fruit; productive. Only moderately thorny; popular in North Central region.
Welcome: fruit medium-sized, red with high vitamin C content; productive, mildew-resistant, nearly thornless.

Other varieties

Lancer: dessert or cooking; fruit large, smooth, oval, very downy, greenish-yellow; strong, vigorous growth and heavy cropper; grows well on most soils.
King of Trumps: dessert or cooking; fruits pale green; bush spreading but moderate growth.
White Lion: dessert or cooking; fruits white, large, oval, slightly hairy; growth vigorous and erect; best white variety for

Pat Brindley

▲ *Pixwell (unripe)*

Brian Furner

▲ *Downing*

Brian Furner

▲ *Careless, an English variety.*

Donald Smith

▲ *Leveller, popular abroad.*

picking green and for dessert; very good flavor.

Careless: cooking; fruits whitish-yellow, downy, large oval shape, veins sharply marked; bush moderately vigorous, spreading with age; resistant to mildew but does not do well under trees, or in poor soil, needs potash.

Lancashire Lad: cooking; fruit deep red, large if not overcropped, oval, hairy, moderate flavor; best picked green for cooking; bush vigorous and spreading, but needs good soil to do well; heavy cropper, resistant to mildew.

Whitesmith: dessert or cooking; fruit pale greenish-yellow to amber, medium to large, downy; bush upright, moderately vigorous, spreading with age.

Keepsake: dessert or cooking; fruit size depends on picking date; pale green, oval and hairy, excellent flavor if left to ripen; bush vigorous and spreading with early foliage which protects young fruitlets from frost; reliable cropper but prone to mildew and flowers liable to frost damage.

May Duke: dessert or cooking; fruit deep crimson when mature, medium size, smooth skin, roundish oval shape; flavor better when cooked green; upright bush of moderate vigor.

New Giant: dessert or cooking; fruits large, yellowish-green, well flavored; bush upright, vigorous but not rampant.

Leveller: dessert or cooking; fruit large, oval, smooth, yellow-green veins sharply marked; good flavor, very popular variety; prolific cropper, but needs good soil conditions to do well; bush spreading; sulfur shy.

Donald Smith

▲ *Glendale*

Harry Smith Collection

▲ *Burgess Colossal*

Royal Horticultural Society, Wisley, Surrey

▲ *Chautauqua*

Derek Fell

▲ *Fredonia*

Outdoor Grapes

Most important are: the eastern or fox grape, *Vitus labrusca;* the muscadine of the South, *V. rotundifolia;* and the European *V. vinifera,* primarily on the West Coast (fam. *Vitaceae*)
Deciduous vine, with a long life, sometimes of several centuries
Planting to harvesting time: 3 years
Size: growing to 60 ft (18 m) in the wild, but in cultivation frequently kept to 5 ft (1.5 m) wide by 4 ft (1.2 m) high when trained on wires
Yield: variable, from a few pounds per plant to many—depending on the type of grape, variety, age, vigor and method of training

The grapevine is one of the oldest cultivated fruit-bearing plants, and its heavy crops are among the most versatile of fruits. The luscious creamy white, green, blue or black berries may be eaten raw as dessert, pressed for their juice which is then fermented for wine, or dried to make raisins, sultanas or currants.

The vines climb by means of coiling forked tendrils, which are produced opposite two out of every three leaves; the leaves are large and hand shaped, and grow on stalks. A wall covered with a vine in full leaf is an attractive feature, particularly in autumn when the foliage of many varieties assume rich red color.

The flesh is always greenish; it is the inclusion of the dark skin that gives the red wine or jelly its color.

Grapevines need cool winters and long, dry summers with plenty of sun for successful ripening of the wood and to convert the acid in the fruit into sugar. The vine can stand frost while it is dormant, but spring frosts occurring after growth has started may kill the new shoots. It does not like humid summers, or excessively rich soil. The grapevine has a reputation for being able to grow where no other fruiting plants would survive. There is some truth in this, because the vine will live on very poor, dry, stony soils without any attention, and its roots will go very deep in search of moisture and nourishment. However, it will not crop well in these conditions; if you want good crops, then its moderate cultivation needs must be met.

Although the juice of the many varieties of grapes can be fermented and made into wine, only a few are selected specifically for this purpose. Dessert grapes need to have a high sugar content and low acidity. Wine grapes need a bal-

➤*A well established vinery of black grapes. Preferably, vines should be in their fifth year before they can carry a heavy crop. Once established, a vine can continue cropping for a hundred years or more, given proper cultivation.*

ance of acidity and sugar, and in addition need some individual quality to lend character to the resulting wine.

Suitable site and soil

Grapes can be grown out of doors in cool temperate areas, provided you plant a suitable variety and choose your site with care. Grapes can be grown in the open on specially erected wire fences or pergolas. In many areas, the ideal site is a south- or southwest-facing slope with shelter from north and east winds. This exposure will give the maximum amount of sunlight and soil warmth, while the slope provides drainage for frost and excess water. Unless the slope is very steep and you plan to terrace it, the rows of vines should run from north to south. In this way, no row shades another and each bush is exposed to the maximum amount of sunlight.

Although the vines tolerate autumn and winter frosts, which can be beneficial because they kill off many wintering pests and diseases, spring frosts can ruin a crop and can damage the flower buds as well as the flowers. Therefore avoid low-lying sites or frost pockets where cold air tends to collect. Grapes are fairly tolerant of a wide range of soils, provided the drainage is adequate. Although a deep, medium textured loam is best, thin soils over gravel, heavy clay

PLANTING

1. Plant in early spring; dig the holes wide and deep enough to take the roots comfortably.

2. Firm planting is essential. Replace the soil in layers; when the roots are completely covered, tread them in.

3. After planting, cut the stem back to three good buds; mulch around the plant with rotted stable manure.

soils and sandy soils will all produce good crops if they are properly prepared before the vines are planted.

Preparation for planting

Although it may involve some hard work initially, correcting any soil or drainage problems is essential if you want reasonable returns from your vines. Do this well before planting, so the soil has time to settle down and the action of weather over a season or two will help to distribute evenly any organic or chemical matter you have added.

Clay soils need plenty of half-rotted straw, peat or other humus and coarse sand worked in to improve drainage and help aerate the soil. Sandy soils or thin soils over gravel are usually poor in nutrients, though drainage is not likely to be a problem. Add well-rotted manure or garden compost to enrich the soil. Loams usually need little in the way of drainage or nutrient correction initially.

Test the acidity of your soil, and add lime if needed to bring the pH of the soil up to about 6.0–6.5. Do not, as a general rule, apply more fertilizer than is absolutely necessary for the particular soil type. Excess nitrates promote lush, rank leaf growth rather than fruit production. The soil should be moderately fertile, rather than excessively rich or poor in nutrients.

If you are digging up established grassland and turning it over to vines, get rid of wireworms. These pests live predominantly in soil under grass, and are particularly fond of vine roots.

Erecting training wires

If you are growing rows of vines, you will need posts and training wires. These will not be needed until the vines are two years old; you can either put them in before planting or spread the initial expense by putting them in a season later. Buy stout posts, 7 ft (2.2 m) long, and apply copper naphthenate preservative to the bottom 2 ft (60 cm). Then drive the stakes into the soil until they are firm, leaving 5–6 ft (1.5–1.8 m) above ground. Spacing will depend on the

vigor of the variety, but 4–5 ft (1.2–1.5 m) between poles should be adequate for small home gardens. To these attach a single 1/10 in (2.5 mm) gauge wire, 15 in (37.5 cm) above the ground. Then run another wire at 2½ ft (75 cm) above the ground. Run a third wire along the tops of the posts to support a net if birds are troublesome in the area. Every wire should be firmly stapled to each post so the wires do not sag when they bear the full weight of the crops. The support system must be absolutely rigid, because when the plants are in full foliage there will be an enormous surface area, and a strong crosswind can do irreparable damage by bringing the whole structure down. If you are having more than one row, allow 5 ft (1.5 m) between rows.

Planting

The best time to plant is in early spring in most parts of the country, although any time during the dormant season will do, as long as the soil is not frozen or waterlogged. If your soil is a very heavy clay, it is best to wait until spring before planting.

Dig a hole 3 ft (90 cm) in diameter and 2 ft (60 cm) deep; keep the topsoil and subsoil in separate piles. The topsoil will probably be darker in color and richer looking. If the soil is heavy, line the bottom 2 in (5 cm) of the hole with drainage material, such as broken bricks, hardcore, or old lime mortar. If, however, your soil is free-draining, omit this additional drainage. Cover the drainage layer, or bottom of the trench, with a layer of well-rotted manure or compost to provide extra nourishment for the young plant to become established. Then put in some of the topsoil, and plant the roots in this medium. Firm planting is absolutely essential if the roots are to become established in the soil. If the vine is pot grown and the roots are pot bound, gently loosen them from a tight ball and spread them out in the soil. After the roots are completely covered with soil, tread them in firmly and bring the level of the soil up to the surrounding level. Finish the job by mulching.

Training

With eastern grapes, usually only one cane is permitted at planting time and that is often cut back to the third bud. The harder-to-transplant muscadines are cut back to one or two buds. Annual pruning thereafter is done while the plants are dormant. Where there is danger of killing back, it is done in late winter or early spring. Muscadines are usually pruned in early winter but, contrary to popular belief, bleeding does little harm to any grape plant.

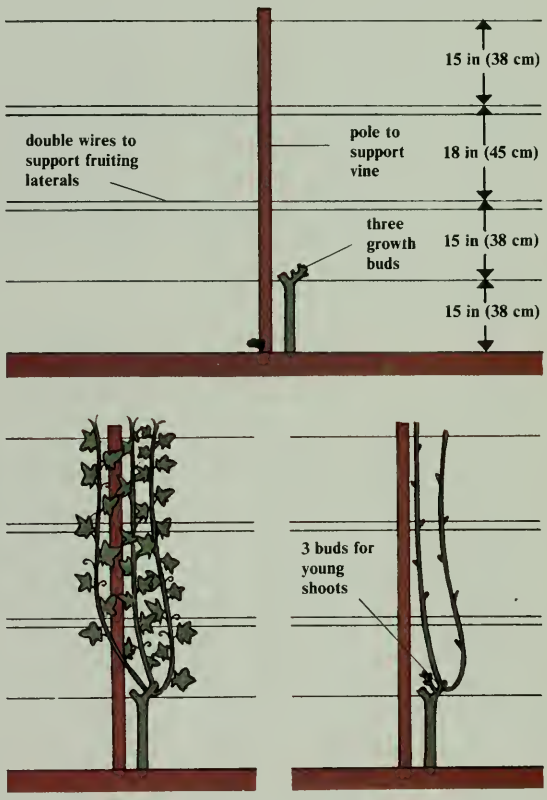
Always keep in mind, however, that the fruit is borne on new wood of the current season which, in turn, is found on stems of the year before. A year-old shoot produces buds in the fall, the next year it produces a shoot from each bud left and attempts to produce 1–4 bunches of fruit near the base of each one of these shoots.

Most home gardeners ignore the 4-arm Kniffen System used by serious or commercial growers, preferring to grow their plants on arbors or fences for ornament and shade as well as the fruit. Where possible, leave one trunk per vine, although any number may be left if the canes are shortened correspondingly to keep them within the capabilities of the vine. Thus, after the pattern is established by the gardener, all canes are cut back to within 1–4 buds of their base, according to the strength of the canes.

Occasionally the fan system is preferred. This uses no trunk at all. Each year as many canes as the vine can support are saved, others being cut back to spurs for future canes, since the canes are not permanent under this system.

Although muscadines are sometimes grown on two wires—one above the other in a modified Kniffen System—most home growers prefer to grow them on arbors or other supports using an overhead system. Frequently this means the vine is trained to a single trunk beside a 7-foot post. When it reaches the top, it is made to branch out horizontally like the spokes in a wheel and the vines allowed to grow with little pruning, relatively speaking. Since they are more vig-

PRUNING FOR A


15 in (38 cm)
double wires to support fruiting laterals
pole to support vine
18 in (45 cm)
three growth buds
15 in (38 cm)
15 in (38 cm)
3 buds for young shoots

1. *For a double Guyot system, cut the vine back to three buds just after planting in autumn or spring. Posts and wires can either be erected before planting or delayed until the following season; each post supports a single vine.*

2. *Next season these will produce three good shoots; tie them in to the cane for support.*

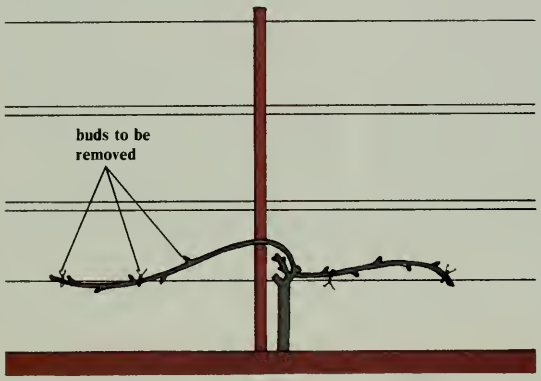
3. *Next winter, shorten the two best to 2½ ft (75 cm). Shorten the third shoot to three good buds. These buds will provide replacement shoots the next year.*

orous plants than the fox grapes, it is not so important that the canes' vigor be revived each year by severe cutting back.

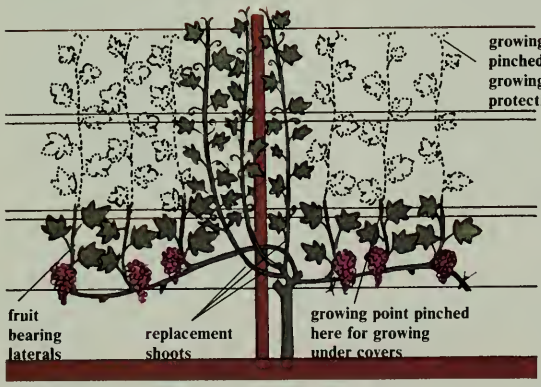
Home growers generally treat their European (*V. vinifera*) grapes in much the same way, on arbor poles. But since the trunks can suffer sun damage in the warm western areas, short spurs are frequently allowed to grow on them to shade them with their leaves. Whenever the vines attempt to overbear, they are thinned by removing some of the flower clusters before they open, or thinning some of the fruit clusters after they have set.

Anyone uncertain of how many buds to leave can be guided by this general rule: if the weight of the prunings from a given plant is less than 1 pound, leave less than 30 buds in all. If it is 2 pounds,

DOUBLE GUYOT



4. *In early spring, when the sap rises, tie the two shoots to the bottom wire right and left. The third shoot is left to send out replacement shoots; remove any other shoots which develop.*


growing point pinched here for growing without protective covers
fruit bearing laterals
replacement shoots
growing point pinched here for growing under covers

5. *Select six to eight laterals per vine; remove the rest by cutting them off close to the horizontal rod. Tie replacement shoots vertically. Pinch out growing points when shoots reach top pair of wires.*

leave 40 buds. If 3 pounds, 50 buds and, if 4, 60 buds. This guide can be followed for northern or fox grapes and to a slightly lesser extent for European grapes, but muscadines are too vigorous.

There are many methods of training and pruning grapevines, all based on the fact that grapes are normally formed on current year's shoots growing from the previous year's wood. A system which is very popular abroad is goblet pruning. The vine is trained into a bush, with six fruiting laterals growing from the top of a stem or leg 18 in (45 cm) long. These fruiting laterals are tied to a cane, forming a goblet shape.

The double Guyot, or replacement, system of training is considered by some to be the one that is most universally successful. The individual vines are kept

smaller, so more plants will be necessary to cover the same amount of space. However, the Guyot method is suitable for poor soils and cool climates.

After planting, cut the stem down to three good buds. The following season these will sprout to produce three strong shoots. The two best are shortened to 2½ ft (75 cm) in early winter, and then, in early spring when the sap rises, they are tied to the bottom wire right and left.

The third shoot is shortened to three good buds, from which three replacement shoots will develop for the following season. Any other shoots which remain are removed. During the year, shoots developing as replacements are trained vertically. Tie a 6 ft (1.8 m) bamboo cane to the wires straight up behind the vine and loosely tie on replacement shoots at 6 in (15 cm) intervals.

During the summer, fruiting sideshoots will form along the one-year-old shoots which you have tied along the bottom wire. Train these sideshoots perpendicularly and support them between the first pair of wires at 2½ ft (75 cm) above the ground and then again when they reach the wires 4 ft (1.2 m) above the ground. In the first year, six to eight laterals per vine are selected and the remainder are removed by cutting close to the horizontal rod.

Regulation and pruning

Do not allow vines to bear fruit until they are at least three years old; if they are cropped too early, they are likely to be poor long-term croppers as a result. For the first cropping year, allow only one bunch of grapes per sideshoot; in the second year allow two bunches per sideshoot, and increase yearly. Remove the surplus flower buds at an early stage.

Pollination outdoors is by insects; if the weather is wet and cold, however, it may be best to hand pollinate. Allow the sideshoots to grow to the top pair of wires, attach them, and then pinch out the growing points. Sub-sideshoots will rapidly develop on each of the perpendicular sideshoots. Cut off each subsideshoot after its first leaf.

Early winter is the best time to prune; cut the horizontal rods back to the stem. The best pair of replacement shoots are shortened to 2½ ft (75 cm). Do not, however, bring them down to the horizontal wires. Delay this for a few months until the sap is rising. The third shoot is shortened to three buds, for next year's replacement shoots.

Feeding and watering

In general, outdoor vines need quite small amounts of fertilizer. A proprietary vegetable-type fertilizer can be applied in late winter or spring at the rate of 1–2 oz per sq yd (30–60 g per sq m). If the soil is very poor, another dressing at the higher rate can be given in early summer.

Apply a mulch of manure or compost in early to late spring, depending on how far north your garden is.

Watering should not be necessary on normal soils in normal conditions; if there is a very dry spring or summer, water thoroughly between the flowering and the stoning (pip-forming) period. Watering later than this may cause the berries to split, but do not let the plants suffer drought.

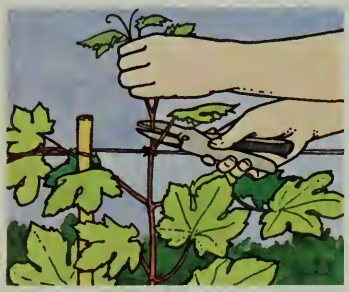
Grape thinning

Vines should not be allowed to bear heavy crops until after their fifth year. Dessert grapes (but not wine grapes) are thinned to improve appearance and quality. First reduce the number of bunches, and as soon as flower trusses have set, unwanted clusters can be rubbed off.

Start thinning when the berries begin to swell, but do not remove all the unwanted berries at once. Do the thinning in two stages, removing the obviously poor berries, and badly placed ones first, and later those that are making the bunch much too crowded. The aim is to space the berries so that each can grow to its full size without restriction, and to produce a well-shaped bunch.

Do not touch the berries, as this destroys the bloom. Use a piece of wire about 6 in (15 cm) long to manipulate

CULTIVATION AND CARE



1. When the selected laterals have reached the top wire, pinch out the growing points and tie in the shoots.

2. Pinch back to one leaf sideshoots which develop in leaf axils; use scissors or thumb and fingers.

3. To prevent powdery and downy mildew, avoid overcrowded foliage, and treat with a fungicide in summer.

4. To get perfect bunches of large, well formed berries, thin the bunches while they are still immature.

5. To prevent insect or bird damage, tie clear plastic perforated bags over immature bunches; do this in dry weather.

6. Harvest grapes on a dry sunny day. Cut the bunches with scissors; do not tear them off the vine.

the bunch being thinned. Use a sharp pair of pointed scissors carefully and avoid pricking and spoiling other berries. Seedless berries are distinguished by their diminutive size and should be cut out first.

Harvesting

It is difficult to state exactly when a grape is right by taste, as people's preferences vary and what is considered ripe and suitable for eating by one person may be considered too sweet or too acid by another. Harvest the grapes on a sunny day, if possible, and cut the bunches with 2 in (5 cm) of lateral on each side of the shank.

Grapes for wine-making should be left on the vine as long as possible, well into autumn if the weather is sunny and dry. This is because you want a very high sugar content in the juice, so that sufficient alcohol will form. Generally, grapes for eating can be picked earlier. If the weather is cold and wet, however, do not leave the grapes on the vine to contract botrytis or rot. Pick them as soon as they show signs of ripeness.

Cloche protection

Giving cloche protection to open-grown vines has a number of advantages. Many of the best dessert grapes normally ripen too late in the season for some areas, but can be grown outdoors successfully when given cloche (transparent covers) protection. Grapes under cloches will be ready up to six weeks earlier than those without cloches. If your garden is located very far north or on an exposed site considered unsuitable for outdoor vines, giving cloche protection will almost certainly allow you to grow grapes successfully.

Cloches also help minimize damage from spring frosts, and if the ends are covered with wire or plastic netting, they protect against attacks by birds.

Cultivation of vines under cloches is the same as for open-grown vines. Vines are usually given cloche protection from their third year onward. Cloches are put on after winter pruning, and removed after harvesting. Do not leave cloches on all year round, because the vines benefit from the low temperature and air circulation in autumn and early winter.

CLOCHING GUYOT TRAINED VINES

Guyot trained vines can be easily given cloche protection. Nip off the growing points of laterals when they have reached the first pair of double wires. Grapes will be ready for harvest six weeks earlier than those without cloches.

Take extra care to keep the fruiting shoots pinched back, so growth does not become overcrowded and tangled inside the cloche. Watch out for mildew, which is more liable to occur in the close conditions inside cloches than in the open.

Growing against a wall

In some areas, grapes grown against south- or southwest-facing walls have many of the same advantages as grapes grown under cloches. There is greater warmth and protection from wind against a wall than in the open; vines will flourish in locations normally unsuitable for open-grown grapes if there is wall protection.

Cultivation is the same for open-grown grapes, with one or two exceptions. The vines will need support from wires, strung at least 6 in (15 cm) away from the wall, and held in place by triangular metal vine eyes, which are hammered into the wall. The soil around the vine should be kept cultivated, and not grassed down, so the vine roots will not have to compete for moisture and nourishment. Remember to water the vine thoroughly in dry weather, until the stone-setting stage, as soil near walls dries out very quickly. Soil preparation and routine feeding will be the same as for greenhouse vines.

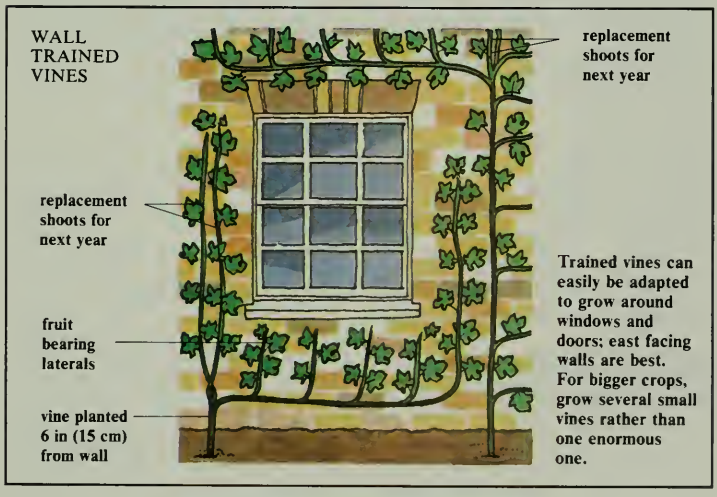
If you have a very large wall to cover, crops will be heavier from several small vines with restricted growth than from one enormous plant.

Propagation

Grapevines are easily propagated from cuttings, vine eyes or layering. The method you choose depends on several factors: if you only have a small amount of vine wood for propagation and want to be sure of a high rate of success, propagation from vine eyes is the best method. If, however, you want to propagate a large number of vines, and are prepared to suffer some failures, then outdoor propagation from cuttings is preferable. This and layering are in some ways easier than the vine eye method, as they require no additional equipment or greenhouse heat.

To propagate by layering, place the whole shoot beneath the soil in early spring. Use pegs or heavy stones to keep the shoot from springing up. New canes will grow from the upward facing buds, and new roots will form on the underside. When there is about 1 ft (30 cm) of new growth above ground, sever the buried shoot into individual plants with a sharp spade. The young vines can then be transplanted into their permanent positions. The young vines will need to be kept well watered and free of weeds, so they are not checked in the early stages of their development. They may make strong new growth, and if necessary, tie them to bamboo canes for support.

To propagate from cuttings, use wood from plants which are at least three years old in early spring. The wood must be hard, fully ripened, dark brown in color,


WALL TRAINED VINES
replacement shoots for next year
replacement shoots for next year
fruit bearing laterals
vine planted 6 in (15 cm) from wall
Trained vines can easily be adapted to grow around windows and doors; east facing walls are best. For bigger crops, grow several small vines rather than one enormous one.

and about ⅓ in (8 mm) in diameter. Each cutting should be about 8 in (20 cm) long and have three or four dormant buds. In most areas you can plant the cuttings outdoors in a prepared V-shaped trench. Put a 3 in (7.5 cm) layer of sharp sand in the bottom of the trench to improve drainage and assist in rooting. Dip the cuttings in water and then in hormone rooting powder. Then place the cuttings in the trench so that only 1 in (2.5 cm) of the cutting is above soil level. Fill in the trench and firm the soil around the cuttings. Do not let the cuttings dry out, particularly in early spring. Water if the weather is dry, and keep the surrounding soil well-hoed. Because the cuttings will be exposed to harsher conditions than plants propagated in a greenhouse in a more controlled climate, there will probably be some failures. There should be a healthy new growth above ground by late summer. Pull up and destroy any cuttings without new growth, as those which have failed to take by then will never do so. At the nursery, they frequently take cuttings in late fall, tie them in bundles and store in slightly moist peat or moss in cold storage just above freezing in order to toughen them before setting them out in the spring.

If you have a greenhouse available, and want a very high success rate, you can propagate cuttings in pots. Put a layer of drainage material in the bottom of an 8 in (20 cm) pot, and fill the pot halfway with a mixture of two parts soil, one part peat and one part sharp sand (by volume). Insert three or four cuttings taken from winter prunings around the edge of each pot in early winter, and fill up the pot with the remaining potting soil. Water well, and give bottom heat as for vine eyes.

To propagate by layering, place whole shoot beneath soil; in late summer, sever buried shoots with sharp spade.

Exhibition tips

Grapes, when well-grown and at their best, can be shown on their own or as the focal point of a mixed fruit display. Two bunches of the same variety is a frequent number shown. Unless otherwise stated in the show schedule, they are displayed hanging vertically from rectangular wooden stands which have been covered with tissue paper, or on plates.

Cut the bunches as close to the time of the show as possible, taking care to handle them by the stalk so the berries are not bruised and the bloom remains intact. When cutting a bunch of grapes, leave a 1 in (2.5 cm) lateral on either side of the bunch stalk, so a T-shaped handle is formed. If possible, cut them from the vine early in the morning while the berries are turgid, rather than in the heat of midday.

As with most fruits and vegetables, size is only one of many qualities judged, and enormous bunches are not necessarily the best. The bunches displayed should be as uniform as possible in size and shape, and should consist of large, fully ripe berries with the bloom intact. Do not display small, badly balanced bunches with berries which are too crowded or too loose, or bunches containing unripe or marked berries or berries without bloom.

George Hyde

▲ *Ribier*

Brian Furner

▲ *Interlaken Seedless*

Brian Furner

▲ *Concord*

Brian Furner

▲ *Niagara*

Varieties

Grapes for the East

Alden: a new early variety; large, blue.
Brighton: another early variety; red; needs pollinator.
Glenora: new, early, black seedless.
Interlaken Seedless: very early variety; golden.
Seneca: early; a hardy vinifera type.
Van Buren: very early; hardy, blue.
Concord: the old reliable; midseason variety, blue.
Delaware: one of the best red type; midseason.
Niagara: best-known white type; midseason.
Catawa: a late red that keeps well.
Golden Muscat: a hardy late variety; large-berried.
Sheridan: a good-keeping, late blue.
Seibel 5279: hybrid wine type; early, white wine.
Seibel 5898: another hybrid wine type; productive; red wine.
Baco No. 1: very early hybrid wine type; red wine.
Foch: hybrid burgundy-type wine; blue.

Grapes for the South

Albemarle: new black.
Magnolia: new bronze.
Scuppernong: old, best known.
Tarheel: new, black.

Brian Furner

▲ *Cardinal (ripening)*

A-Z collection

▲ *Muscat of Alexandria*

A-Z collection

▲ *Brant, popular in Canada.*

European/California grapes
Cardinal: red, table type.
Flame Tokay: red, table type.
Muscat of Alexandria: white wine.
Ribier: black, table type.
Thompson Seedless: green, table type.
White Riesling: white wine.
Zinfandel: red wine.

Other varieties
Brant: Canadian grape with heavy crops of small black grapes; flavor only moderate; best used for winemaking; if given wall protection, ripens early; has a good display of red autumn foliage.
Black Hamburg: excellent general purpose black grape; large black berries and bunches; fruit hangs well; late ripening; does best on warm wall.
Royal Muscadine (Golden Chasselas): dessert or wine-making; pale golden berries, excellent sweet Muscat flavor; does well on warm wall or under cloches; old variety, but very popular.
Perle de Csaba: mainly for dessert; yellowish, medium-sized fruit with Muscat flavor; not a reliable cropper when young.
Pirovano 14: very reliable, mainly used for dessert; reddish black grape of good flavor; prolific in a warm situation.
Muscat de Saumur: mainly used as a dessert grape; very early crops of medium-sized golden yellow grapes; moderately reliable cropper but does best with some wall protection; good Muscat flavor.
Precose de Malingre: early dessert variety; small, golden yellow berries with sweet flavor; heavy and reliable cropper.
Millers Burgundy: late variety with small, sweet black grapes; decorative, woolly white foliage.
Buckland Sweetwater: large bunches of white berries; excellent general purpose white; unfortunately, it is somewhat prone to mildew.
Seyve Villard 5.276: very reliable cropper with white grapes for wine-making; regarded as one of the standard white wine grapes; suitable for any well-drained soil.

Pests & Diseases

Powdery mildew: the symptoms of this fungal infection are very pale powdery patches which appear on the leaves, young canes and grapes. If the young growing shoots are very badly damaged, early in the season, then the baby grapes may be completely destroyed. If the infection occurs later in the season, the fruit will be cracked and moldy. Powdery mildew tends to occur in wet autumns following hot dry summers. Avoid overcrowded foliage, as this encourages the disease. The best precaution is spraying with an approved fungicide at the end of blossoming period and again two weeks later.

Downy mildew: this fungus usually appears later than powdery mildew, after blossoming time. If the leaves are infected, the upper surfaces will look as though they have oil spots on them and thick, pale gray down will appear on the leaf undersides: infected fruits will turn brown and fail to ripen. Spray as for powdery mildew, in early, mid and late summer.

Anthracnose (black spot): this disease affects many garden plants and can travel from other plants to grapevines. It is usually associated with warm, damp, close conditions. If the canes are infected, brown spots appear which eventually merge into each other. Light brown spots may also appear on the leaves or berries: the spots later turn red with dark margins and the dead tissue may fall out leaving holes in the leaves. Burn all prunings from infected vines, so the disease does not spread. If your vines are infected, apply a dormant oil spray.

Royal Horticultural Society

▲ *Grapes infected with powdery mildew: this fungal infection is worse in wet autumns.*

Phylloxera: this serious pest did enormous damage in Europe in the nineteenth century when it completely destroyed many vineyards. The insect has a very complicated life cycle, but is most damaging when it eats the roots of grapevines which leads to the death of the plant. At one stage in its life cycle, it lives on the leaves and makes small galls in which the grubs develop; these galls are the main above-ground symptoms. The practice of grafting European varieties of grape onto stronger American rootstocks has greatly diminished damage by phylloxera.

Scald (sunscald): this is a physiological disorder due to excessive moisture on the berries during hot weather. Affected berries become scalded looking and sunken, usually at the top of the berry. Avoid overcrowded growing conditions and provide adequate ventilation to minimize sunscald damage.

Shanking: this is another physiological disorder, usually associated with a faulty soil structure, which results in an unfavorable water supply. Overcropping or malnutrition may also bring on the disorder. The first symptom is a spot on the stalk of the berry; eventually the stalk withers and the berry shrinks. The skin of black-skinned varieties turns red, while gold- or green-skinned varieties appear translucent. The best precaution, and the best cure, is good cultivation.

Magnesium deficiency: if there is a lack of this trace element in the soil, leaves will turn yellow or orange between the

GUIDE TO OUTDOOR GRAPE TROUBLES

Symptom	*Probable cause*
Pale powdery patches on leaves, young canes and grapes	Powdery mildew
Thick gray down on leaf underside, fruits turn brown and do not ripen	Downy mildew
Brown spots on leaves, canes or berries	Anthracnose
Webs on young fruits, fruits fall	Berry moth
Scalded looking, sunken berries	Sunscald
Stalk withered, berry shrunken and discolored	Shanking
Yellow leaves which turn brown and wither	Magnesium deficiency
Spots on berries containing rings of fungus	Rot
Small galls on leaves, roots eaten	Phylloxera
Chewed leaves	Japanese beetles, other chewers
Stunted and distorted leaves	Aphids

veins. Eventually the discolored area will become brown and die. If you mulch with well-rotted garden compost or other bulky organic matter, the problem should gradually be eliminated. If such manures are not available, Dolomite, or magnesium limestone can be applied at the rate of 7 oz per sq yd (210 g per sq m). You can also correct the deficiency in the short term by spraying with 8 oz of magnesium sulfate in 2.5 gal of water (240 g of magnesium sulfate in 11 L water).

Rot: this disease is caused by a fungus. It appears as spots on the berries; in the spots are rings of fungus pustules. Avoid overcrowded conditions and keep the air circulating freely around the plants. Remove any diseased berries to reduce the risk of further infection. Spray with your state-approved fungicide. Remove shriveled or dried fruits promptly.

Ministry of Agriculture, Food & Fisheries

▲ *Grapes suffering from shanking, a physiological disorder due to poor cultivation.*

Aphids: like aphids anywhere, they cluster on the tips of young, tender growth where they suck out the plants' sap. Spray weekly as needed with Sevin or rotenone.

Berry moth: surrounds young developing berries with a web. Loosened from their stems, they fall off. Spray with Sevin or malathion just after blossoms fall, repeating if necessary.

Japanese beetles; assorted leaf chewers; leafhoppers: spray early growth, repeat after blossoms fall and later as needed with Sevin or malathion.

Grape dead arm disease: this fungus attacks leaves and canes, then stems and flower clusters, causing dark-centered angular spots. Buds are killed and fruit may rot. Through pruning wounds, vine branches (arms) are infected and often killed. Remove diseased vines at ground level during winter pruning; spray new shoots with an approved fungicide.

step-by-step growing guide

Greenhouse Grapes

Dessert, greenhouse grapes are normally varieties of *Vitis vinifera* (fam. *Vitaceae*)
Deciduous vine, with a life of many years
Planting to harvesting time: 3 years
Size: normally kept to a long rod 12–16 ft (3.6–4.5 m) in the greenhouse
Yield: a long rod, 12–16 ft (3.6–4.5 m) long, will produce 10–12 bunches per year

European grapes are usually considered to be a warm climate fruit, and it is true that they prefer long, hot summers in order to ripen fully. Nevertheless, excellent quality dessert grapes are grown in greenhouses in temperate climates. These shy-setting varieties, particularly the "Muscats," set fruit well in the artificial conditions of a greenhouse. Although you can grow wine varieties in a greenhouse, it is much more sensible to use your greenhouse for the sweeter and more delicate dessert varieties, producing high quality grapes which you would not be able to grow successfully outdoors—except in an area such as California.

Unfortunately, grapes dislike the growing conditions preferred by most other greenhouse crops, such as tomatoes and cucumbers. To get first-class grapes, you really need a specialized vinery where an ideal environment can be maintained. But do not worry if you cannot afford to devote a whole greenhouse to grapes; you should succeed in producing moderate crops of all but the most delicate varieties in the normal, home gardener's mixed greenhouse. Once established, a vine will produce good crops for a modicum of effort.

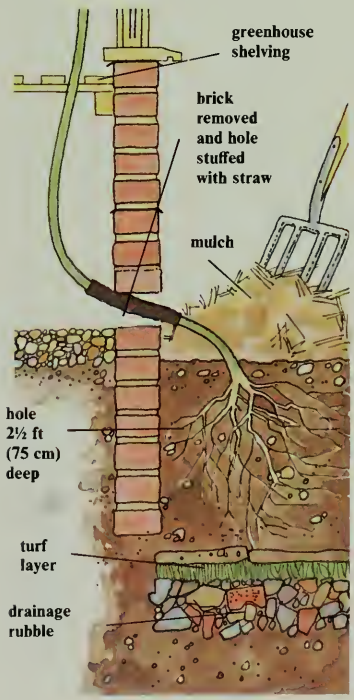
Preparing the border

Vines like to spread their roots, but you will get heavier crops if you restrict this tendency; if you allow the root free rein, the vine will produce a lot of vegetative growth at the expense of fruit. By confining the roots to a prepared border, you can better regulate the amount of water and nutrients the plants receive.

The traditional treatment of a vine border is to increase its size gradually as the vine grows older and bigger. This is definitely the best way of growing greenhouse grapes, as it ensures a balance between root and shoots throughout the life of the vine, and prevents the nearby soil becoming "sour" and infertile. The traditional preparation of a vine border takes much time and effort, but is well worth it, and skimping on border preparation can never be "made good" once the vines have been planted.

Good drainage is the most essential feature of a satisfactory vine border. If you are planting the vines indoors, the border should ideally be about 5 × 10 ft (1.5 × 3 m) for each vine, although you can produce quite good grapes with smaller borders. Dig out the soil to a depth of 2½ ft (75 cm), keeping the topsoil and subsoil separate, and fill the bottom with 6–10 in (15–25 cm) of rubble to provide a drainage layer.

Cover this layer either with turf laid upside down, or with about 6 in (15 cm) depth of straw—or, better, salt hay—to prevent the soil percolating down into the drainage layer and blocking it. Then return the soil to the border, mixing it with two 2½ gal (12 L) buckets of rotted manure and 4 oz (120 g) of bone meal per plant, making sure that the topsoil goes back on top. Tread the soil down lightly as it is returned, so there is not too much subsidence later. Border preparation should be done two to three months before planting, to give the soil time to settle naturally.



Plant your vine in a hole 2½ ft (75 cm) deep, the bottom of which has been filled with 6–10 in (15–25 cm) of rubble covered with turf. You can plant outside and train the vine through the greenhouse wall.

Outdoor borders

If your greenhouse space is limited, and you wish to grow other plants as well as grapes, then it is a better idea not to plant the vine indoors at all, but to plant it outdoors and train the above-ground portion into the greenhouse through a hole in the wall. Although vine roots appreciate the cooler temperatures of outdoor life, the cropping will probably not be as heavy as completely indoor-grown grapes, because you cannot really restrict the root run to any extent.

Remove a brick from the greenhouse wall at ground level where you want the vine to enter; temporarily block the hole with straw or newspaper until you come to train the vine through it. Then prepare the outside border as you would an inside border.

Planting

The number of vines you plant and their spacing depends on the way you intend to train them and on the size of your greenhouse. The best time to plant is when the vine is about to start into growth in late winter or early spring; alternatively, early autumn is equally suitable if not planted outdoors. Use strongly rooted vines, preferably about two years old. Dig a hole in the border a little deeper than the depth of the roots and plant the vine, making sure to spread the roots out well. Cover the roots with crumbly soil and water generously after planting, using tepid water. Make sure the vine is planted at the same depth as it was in the pot.

Place a stake 6 ft (1.8 m) tall behind the plant, ideally before filling the planting hole, so you do not inadvertently stab the plant's roots. Immediately after planting, cut the plant back so that two buds are left on a stump which may be 6–12 in (15–30 cm) tall. Sometimes the vine will arrive already pruned. If you are training the vine through a hole in the greenhouse wall, cut back enough to leave a length of stem, which has two buds on it, inside the greenhouse.

Methods of training

How to train your vine will be largely decided by the shape of your greenhouse. In a small ridge house, the best method is to plant the vine near the end wall (normally in an outside border) and then train it vertically up the end wall until it is about 18 in (45 cm) from the roof. From there train it horizontally along the greenhouse ridge.

You can use this method of training in three-quarter span houses as well, but in these it is more common to plant the vine along the side wall of the house and then train it up the angle of the glass, remembering to keep it about 18 in (45 cm) away from the glass. You can train the vine to produce one, two or occasionally more main branches, called *rods*, each of which is trained up the sloping side of the greenhouse until it almost reaches the ridge.

If you are planting more than one vine, and intend to train just one main branch from each plant, space the vines at 5 ft (1.5 m) intervals. If you are going to train two main branches; plant the vines at 7 ft (2.1 m) intervals.

Vines in a lean-to greenhouse can be trained in the same way as those in span houses, unless the vines are sharing the house with other plants, such as a peach or fig tree trained against the back wall. If this is the case, plant the vines at 10 ft (3 m) intervals and train them horizontally about 2 ft (60 cm) from the ground.

Supporting the vine

A fully grown vine can be very heavy and must be well supported on strong wires. Whatever method of training you select, the wires should be horizontal, 1 ft (30 cm) apart, and firmly attached to the greenhouse framework by vine eyes. Tie young vines to the wires with soft string; older vines can be tied with ordinary string.

Training and pruning

With greenhouse-grown vines, you are aiming to produce one, or occasionally two permanent woody stems, called rods. This rod should be trained until it is about 2 ft (60 cm) from what is going to be the maximum height of the vine—this is the greenhouse ridge in a span house or the end wall in a small ridge house—and then cut off, or stopped. Sideshoots produced by the permanent rod, eventually called *spurs*, are also stopped, just two buds from the permanent rod. On an established vine, the grapes and leaves are produced on the sideshoots, which are cut back each year, so building up a fruit spur; cutting back is done after the fruit has been picked.

In the first spring after planting, your vine will produce sideshoots from the cut-back main stem. Pick the strongest one of these and rub out all the others with your thumb; this is most easily done when the sideshoots are still tiny. The surviving shoot is going to become your permanent rod; tie it vertically to the cane.

After a while, sideshoots will develop on the permanent rod and these should be allowed to grow until they are about 18–24 in (45–60 cm) long, when they should be stopped just above a leaf.

Pick the strongest sideshoots, spaced alternately on either side of the permanent rod, with a gap of about 18 in (45 cm) between two shoots on the same side. Tie the selected shoots to the training wires and prune off all the others. These selected shoots are going to become the spurs on which the fruiting laterals are formed. Any sub-sideshoots should be reduced to one or two leaves only. Cut them off just above a leaf.

The permanent rod should be allowed to grow freely, until it reaches the limit

of its allocated space—that is 2 ft (60 cm) from the greenhouse ridge or end wall—when it should be stopped just above the nearest convenient leaf. After doing this, sideshoots and sub-sideshoots can be allowed to grow freely until the end of summer. Tendrils and embryo flower buds must be rubbed out ruthlessly when still tiny. You need to channel all the strength of the plant into producing the permanent rod and spurs. The main rod and subsidiary sideshoots will all need tying at least once a week, to ensure straight stems, and stopping will need to be done frequently.

In the autumn, when the leaves have turned brown but have not yet fallen, prune the permanent rod back to between half and two-thirds of its original length, and prune the sideshoots to leave one or two buds on each. It is customary to prune early in the autumn rather than in the winter, otherwise the cut stem surfaces will "bleed," as the sap begins to rise near the time of new growth—although research shows the bleeding does no great harm.

In the following spring the vine will produce shoots from all the dormant buds. Allow the strongest shoot at the tip of the permanent rod, and the strongest shoots from each spur, to grow on; rub out all the others, including any produced below the first wire. Allow the new permanent rod to continue until it reaches 2 ft (60 cm) from the end of the space allotted for the vine, as before, and then cut off its tip once more.

Tie the sideshoots produced from the embryo spurs to the training wires with soft string; do this as gently as possible. If any shoots are a long way from the wires, do not attempt to tie them all the way to the wire at once. Instead, tie them loosely with a loop of string to begin with, gradually tightening this loop over a period of weeks. If you tie the sideshoots down too fiercely at first, you risk breaking them, and possibly damaging the spur as well. Stop them at a maximum of 2 ft (60 cm) in length, as before, and allow to grow freely once the main shoot reaches its maximum length.

Sideshoots produced on the new part of the permanent rod should be treated the same way as the sideshoots were treated in the previous year and pruned to produce spurs. Sub-sideshoots produced on the laterals should be cut back, as before, to one or two leaves.

If the vine is growing strongly, two or three fruit bunches can be allowed to develop on the lower part of the vine; pinch off all other fruit bunches and tendrils. If you allow more than three fruit bunches to mature, you will overtax the young vine.

At the end of the second summer, you will very nearly have finished training your vine. Cut back the new sideshoots so that there are one or two buds left on each, and reduce the new growth of the permanent rod by about a third.

In the following spring, select the strongest shoot at the tip of the permanent rod and let it grow until it reaches the maximum length allowed. Sideshoots produced along this final piece of permanent rod are pruned to produce spurs as before; next year treat them as established wood. Sideshoots produced on spurs on the two- and three-year-old parts of the permanent rod are pruned as established wood now.

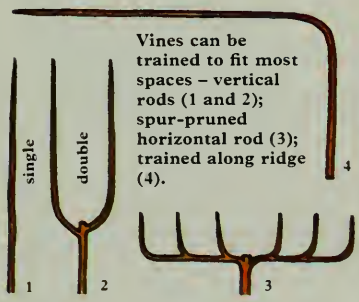
Routine pruning of established vines is as follows: in early winter prune off any new growth at the end of the permanent rod and cut back the new shoots on the spurs to two buds. In the spring, rub out one sideshoot at each spur, leaving the stronger, when the shoots are about 1 in (2.5 cm) long. Additionally, leave one growing at the end of the permanent rod. In the summer, prune off all sideshoots, either above the second leaf after a fruit bunch if they have produced one, or above the sixth leaf on the shoot if they have not. Tie the sideshoots to the wires. Pinch out all sub-sideshoots produced, and all the tendrils.

A vine trained in this way should continue to produce sideshoots on the spurs for many years, although the spurs themselves will become very gnarled. Vines trained horizontally in a lean-to greenhouse are treated in exactly the

A–Z Collection

▲ *Well-grown vines trained along the sloping roof of a greenhouse.*

➤*The usual way to train vines in the greenhouse is as a long permanent rod from which fruiting sideshoots are produced on spurs and trained horizontally.*



Vines can be trained to fit most spaces – vertical rods (1 and 2); spur-pruned horizontal rod (3); trained along ridge (4).

Harry Smith

same way except that the sideshoots are trained vertically upward from the permanent rod instead of horizontally.

Promoting bud burst

One of the problems of growing vertically trained vines is that buds at the top of the permanent rod near the glass tend to burst first and then sap most of the strength of the vine at the expense of the buds at the base of the plant. To promote an even bud break, the vine should be taken down from the wires during the winter and laid gently on the ground; this encourages buds at the bottom of the vine to burst. As soon as they do, tie the vine back up to the wires; this encourages buds higher up the vine to begin sprouting in their turn.

Start promoting bud burst in late winter. Close the ventilators, opening them only when the temperature rises above 50°F (10°C), and syringe the plants with tepid water at mid-morning and again during the late afternoon. Do this on sunny days only. In addition, maintain a moist atmosphere by damping down the walls, path and border.

TRAINING A PERMANENT ROD

Greenhouse grapes are normally trained as one main branch (the permanent rod) from which sideshoots are produced each year. The sideshoots are cut back to short projections (spurs) in the autumn. Use a 6 ft (1.8 m) cane and wires spaced at 1 ft (30 cm) intervals to support the newly planted vine. Dispense with the cane after the first winter. The initial training takes three years and should be carried out as follows.

1. In the spring, the newly planted vine will produce sideshoots.

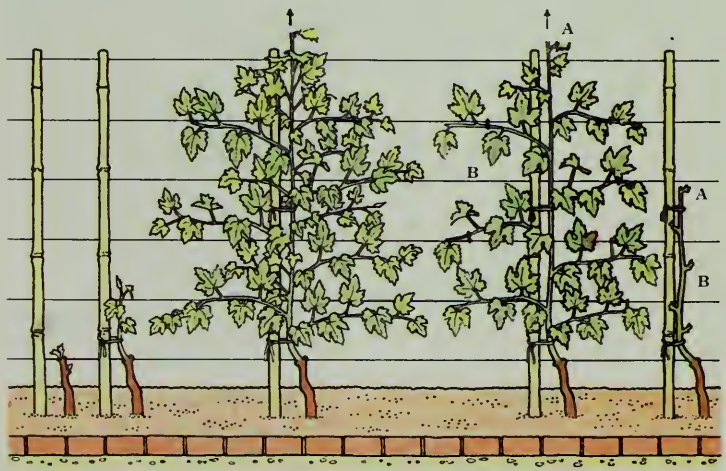
2. Rub out the weaker sideshoots leaving the strongest one. Train this to form the permanent rod.

3. The permanent rod will produce a mass of sideshoots.

4. Stop the permanent rod 2 ft (60 cm) from the greenhouse wall or ridge (A). Pick the strongest sideshoots, spaced alternately, and cut them to 18–24 in (45–60 cm) long (B).

5. Cut the permanent rod back to half to two thirds its length (A). Prune sideshoots to two buds (B).

6. Stop the permanent rod 2 ft (60 cm) from the glass (A). Select the best sideshoots on the new part of the permanent rod and



1. First spring 2. First spring 3. First summer 4. First summer 5. First autumn

prune them to 18–24 in (45–60 cm) long (B). On the older portion of the permanent rod, select the strongest sideshoot from each spur and train it to the wires (C). Let no more than three bunches of grapes develop. Any more will overtax the young vine.

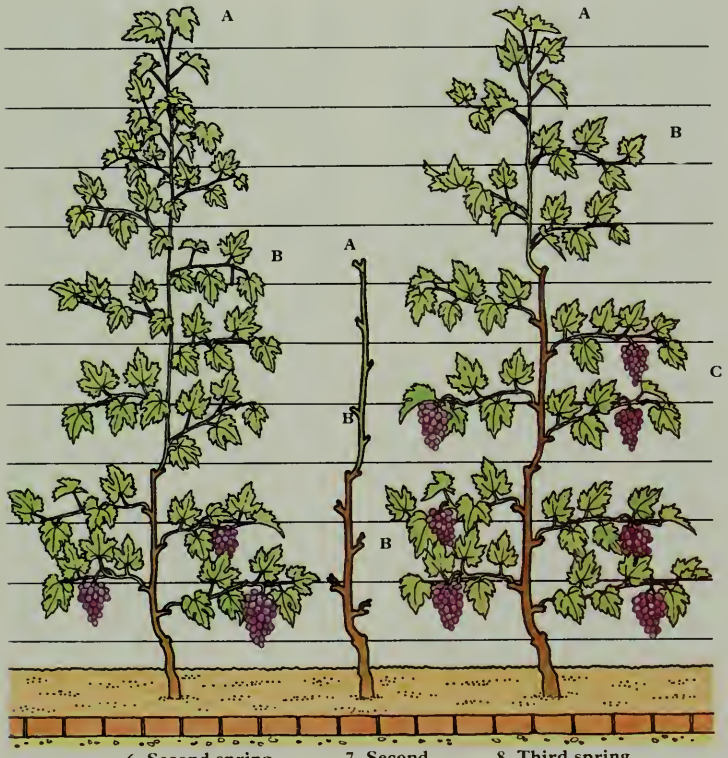
7. Cut the new part of the permanent rod back by a third (A). Prune sideshoots to one or two buds (B).

8. Stop the permanent rod 2 ft (60 cm) from the glass (A). Select the best sideshoots on the new part of the permanent rod and prune them to 18–24 in (45–60 cm) (B). Stop the sideshoots on the old part of the permanent rod after two leaves beyond a fruit or after six leaves if no bunch develops (C).

You do not want the atmosphere to become too damp, however, so never syringe or damp down on dull days or late in the day. Once the buds break, stop syringing the plants but continue damping down.

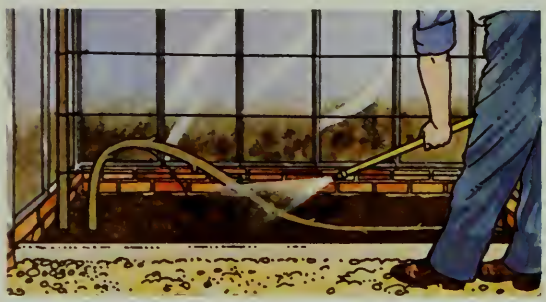
Spraying

While the vines are lying on the ground during the winter, they should be sprayed to protect them against insect pests. Scrape off any loose bark, and then spray the vines with a dormant oil if trouble was experienced in the summer with scale insects, mealy bug or other

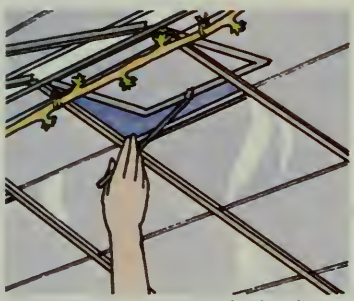


6. Second spring and summer 7. Second autumn 8. Third spring and summer

CARE AND CULTIVATION



1. In the late winter lay the vine on the border and syringe it to promote bud burst. If you do not do this the buds at the top of the vine, near the glass, will develop at the expense of buds lower down.



2. When the buds burst, tie the vine back up to the wires and close the ventilators to warm the house.

3. Tie the laterals gently down to the wires. Be careful, as it is easy to snap them off.

pests. At the same time, tidy up the greenhouse, removing old leaves and other debris.

Feeding

Although grapes grown in Mediterranean climates often flourish on thin, infertile soil, in cooler climates they appreciate feeding. In late winter, rake off any old mulch around the plant and dress the surface of the soil with proprietary fertilizer at the rate of 1 lb per sq yd (0.5 kg per sq m). If you cannot obtain specialized vine fertilizer, use ½ lb per sq yd (0.25 kg) of good, vegetable fertilizer. Fork fertilizer in lightly and mulch soil surface with half-rotted manure.

Feed the plants as soon as the fruit has been thinned in the early summer, using the same fertilizer at the rate of ¼ lb per sq yd (120 g per sq m). Once set, grapes swell fast until the seeds begin to form. They then cease to swell until this process is complete, when they begin to enlarge again. Give another application of fertilizer at the end of the seeding period.

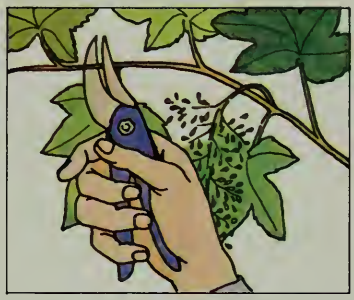
If you are growing for exhibition, however, give an early summer dressing of fertilizer at ¼–½ lb per sq yd (120–240 g per sq m) and then from the second swelling stage, at two-week intervals, water with a liquid fertilizer, at the rate of 2½ gal (12 L) per vine, until the berries begin to change color.

Watering

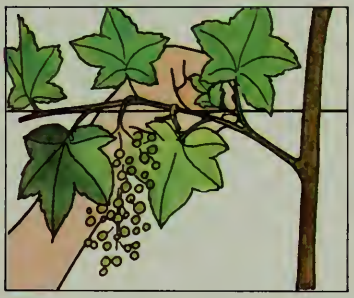
In late winter or very early spring, when the top-dressing has been applied, begin

CARE AND CULTIVATION

4. Pollinate shy setting varieties by running your hand gently down the embryo bunches; method also cross-pollinates varieties.

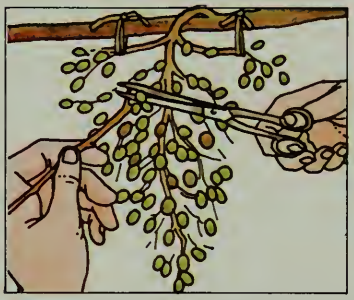


5. Stop fruiting laterals two leaves beyond the fruit and non-fruiting laterals after six leaves.

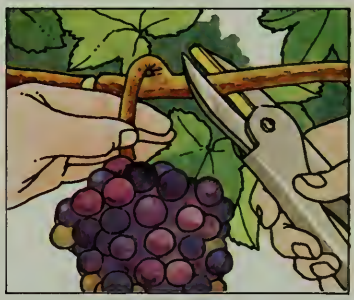


6. Pinch out all sub-sideshoots in the leaf axils of the sideshoots and remove all tendrils.

7. Remove about half the embryo bunches (the smaller clusters) to encourage large, well-formed bunches.



8. Thin the bunches with long scissors. Do not touch the grapes or you will wipe off the bloom (powdery coating).



9. Harvest the bunches by cutting the laterals 1 in (2.5 cm) on either side of the fruit stalk.

watering. Soak the soil with water at the rate of 2 gal per sq ft (10 L per 100 sq cm) and water generously in this way two or three times more: once when the shoots are growing strongly, but before the flowers open, once when the berries have begun to swell and at other times if necessary, the object being to prevent the soil from becoming dry, especially deep down. Maintain a moist atmosphere by damping the floor and benches often.

Heating and ventilation

Vines are extremely hardy once they have become dormant in the winter and grow better in summer if they have been subjected to winter cold. During the winter, fully open the ventilators of the house to allow the cold to enter.

Close the ventilators when you wish the vines to begin shooting in early spring, and allow the greenhouse to warm up. In a heated house try to maintain a minimum temperature of 40°F (5°C) and ventilate if the temperature rises above 50°F (10°C). Nevertheless, close the house down before it becomes dark in the evening to retain some of the sun's warmth.

Maintain the same temperatures as above while the fruit is setting; but keep the atmosphere more buoyant by keeping a crack of ventilation open at night.

Once the fruit has set allow the temperature to rise to 65°F (19°C) before ventilating and maintain, if possible, a minimum night temperature of 50°F (10°C). As the summer approaches you will need to gradually admit more air to keep the temperature down.

Pollination

In late spring, the vines will begin to flower. Good fruit setters, such as Black Hamburg, will set pollen if the vines are merely tapped smartly by hand at the base of the permanent rod. This will dislodge the flower caps, allowing the pollen to disperse.

Setting of the fruit in other varieties, particularly the Muscat kinds, however, should be aided by cupping the embryo fruit bunch in your hand—which should be dry—and then running your hand caressingly down the bunch. If you do this to different bunches in turn, you will transfer pollen from one bunch to another. Better still, if you are growing more than one variety, the best set of all is obtained by cross-pollinating two varieties by alternately running your hand down a bunch belonging to one variety and then the other. Particularly difficult setters, such as Muscat of Alexandria, can be cross-pollinated using a camelhair brush.

PROPAGATION FROM VINE EYES

1. In late winter, cut short cuttings (eyes) from sideshoots preserved from the autumn pruning.

2. Each cutting should have one bud. Peg the cutting, bud upwards, onto sandy soil.

Grape thinning

About a month after fruit set, the grape bunches should be thinned. It is impor-

tant that this should be done to all young vines—they are severely weakened if they are allowed to bear a heavy crop before their sixth year. But you should also do it to mature dessert grape vines to improve size and quality.

Harvesting and storing

Approaching ripeness is indicated by a dark tinge on black grapes and by a slightly transparent appearance to white grapes. When you see this, reduce the humidity of the greenhouse by ceasing damping and by opening the ventilators. Black grapes color best if kept shaded, but white grapes ripen best in direct sunlight; remove foliage shading these.

Birds may be a problem if the ventilators are open. Fix wire netting across them to let in air but exclude birds.

Grapes are rarely as ripe as they look; so taste one before deciding whether to pick a bunch. Harvest the bunch by cutting the lateral 1 in (2.5 cm) on either side of the stalk holding the bunch.

If you are not ready to eat all the bunches when they are ripe, they can be left on the vine, removing any berries that begin to go rotten. Alternatively, you can cut the bunches off with a long piece of stalk. Place the stalk in a bottle of soft water placed at an angle, with the grapes hanging over the side. Then store in a cool but dry and frostproof place.

Growing in pots

If you have a very small greenhouse, most of which must be devoted to other plants, but you would still like to grow greenhouse grapes, try growing one vine in a pot. Obviously, the size of the vine must be reduced to balance the restricted size of the roots, and pot-grown vines cannot be expected to produce such heavy crops as those in deep well-prepared ground beds. Nevertheless, a small crop of reasonable quality can be obtained from a pot-grown vine.

Use the biggest container you have space for. An un-creosoted wooden cask or plastic tub 2 ft (60 cm) in diameter and 2 ft (60 cm) deep is ideal. The container should be filled with a rich potting mixture. Once the buds of the vine have burst, feed with liquid fertilizer every week and water daily in hot weather. Otherwise treat the vine in the same way as those grown in borders.

Train a pot-grown vine as a single rod as far as the greenhouse roof. Repot in fresh soil every other year, and top-dress with rotted organic matter in alternate years in late winter.

Propagation

Vines can be propagated from cuttings, from vine eyes or by layering.

Harry Smith

▲ *Alicante, cultivated abroad.*

Harry Smith

▲ *Black Hamburg*

Varieties

Black Hamburg: the most commonly grown indoor variety; large, oval, black. Sets fruit well, easy to grow.

Flame Tokay: very large red berries, top quality; productive but a bit tender.

Muscat Hamburg: well flavored, reddish-black, medium-sized; does not set fruit as well as Black Hamburg. Late.

Muscat of Alexandria: large, oval, dull green, strong muscat flavor; not the best setter of fruit. A bit tender.

Perle de Csaba: very early, yellowish-white; muscat-flavored. Hardy, good.

Ribier: early midseason; large, black. Popular fruit, does especially well as a cordon.

Other varieties

Alicante: thick-shouldered bunches of large, black oval berries: berries have very short stalks so early thinning is essential; good fruit set; will grow in an unheated house in warm, sheltered areas, when grapes will hang well into the winter.

Mrs. Pince: black Muscat grape; large, sweet, oval berries; good fruit set; can be grown without heat in a warm, sheltered area but ripens much earlier when grown in a heated greenhouse.

Blackland Sweetwater: ripens to greenish gold; juicy; sweet; good fruit set.

Gros Colmar: large black grapes; rather thick skinned; good flavor; easy to grow.

Donald Smith

▲ *Muscat of Alexandria*

Harry Smith

▲ *Muscat Hamburg (ripening)*

Harry Smith

▲ *Perle de Csaba*

Pests & Diseases

Do not be put off by the length of this list. Well-grown grapes are not particularly prone to pests and diseases. Rather they suffer from a wide range of troubles, many of which are extremely rare and which you are very unlikely to meet, especially if you correctly spray with a dormant oil during the winter. It also helps, of course, to control weeds and to keep your vines cleared of dead or diseased leaves and branches.

Red spider mite: This pest occurs most commonly in greenhouses which are too dry and the best precaution is frequent damping down and watering. The leaves of infested grapevines become speckled grayish-green and are covered, particularly on the undersides, with tiny pale red insects only just visible to the naked eye but which can be seen clearly with a hand lens. Seriously attacked leaves turn yellow and die. The most effective control is to fumigate the greenhouse. Alternatively, you can spray with malathion.

Aphids: pale green leaves with curled tips are a symptom of the attack of aphids. The small green insects can be seen on the leaves and stems. You are unlikely to be bothered with this pest if the vines have been sprayed with a dormant oil during the winter, as the oil destroys the wintering eggs. If you do suffer from aphids during the summer, however, pinch off all infested leaves and burn them. Then spray the vines with Sevin, rotenone or malathion.

Scale insects: scale insects are flat, dark brown and oval-shaped insects, about ⅛ in (3 mm) long, which feed by sucking the sap, mainly from the stems of the vine. The insects themselves are difficult to spot against the bark, as they are the same color, but they often exude a sticky substance, called honeydew, which is usually accompanied by a black mold. The bark of infected plants is thus black and sticky. Sponge off the sooty mold and then scrape off as many insects as possible with the back of a knife. Scrape the insects onto a piece of paper and then burn them. Kill any remaining on the vine by spraying with malathion; repeat at ten day intervals if necessary. The dormant oil spray should control them.

Mealy bug: these small white insects feed in a similar way to scale insects, living on the stems and leaves and sucking the sap of the plants. The most obvious symptom of an infestation is a white or gray cotton woollike fluff on the shoots. During the winter the bugs shelter beneath the bark and a useful precaution is to scrape the bark with the back of a knife to dislodge them. A winter dormant oil spray also gives valuable protection. In addition they can be controlled by spraying with malathion; but if you use a spray, make sure to add a wetting agent. The fluff which surrounds the insects is waxy and repels the spray if no wetting agent is added.

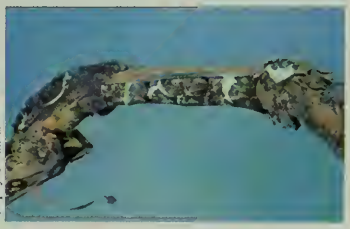
Botrytis (gray mold, noble rot): this fungus is only likely to occur in cool, wet conditions and is most common in unheated greenhouses in the autumn. It appears as a furry, grayish growth on the berries and foliage. The disease concentrates the sugar content of the grapes without rotting them completely and if wine is made from the diseased grapes it has a sweet, luscious flavor. In the Sauternes district of France, the disease is encouraged by commercial wine growers to enable them to produce sweet Sauternes wines. It is important, however, that the grapes are nearly ripe before they become diseased; if they are not, the bunches may drop prematurely.

If your grapes become diseased when they are nearly ripe and you intend to make wine from them, then count yourself lucky and leave the disease alone. If the berries are unripe, or you want dessert grapes, however, spray them with an approved fungicide.

Honey fungus: this is serious, although, luckily, it is only common on badly drained soil. Honey fungus infects the roots, particularly where they join the stem just below the soil surface. If the bark is removed at, or just below, soil level, fungus can be seen as a white, flat,

Ministry of Agriculture, Fisheries & Food

▲ *Botrytis or gray mold—use an approved fungicide to control it on dessert grapes.*



Murphy Chemical

▲ *Scale insects live on the bark and suck the sap of the plants.*

fanlike growth on the surface of the exposed wood. The fungus sends out creeping, black shoelacelike threads below the soil surface to infect other plants and it also produces honey-colored toadstools on the ground around the stems of infected plants. Infected plants die within a year or two.

There is no successful cure for honey fungus and the best you can do is to prevent the disease from spreading. Dig up infected plants, with as much root as possible, and burn them. Then fork the soil and sterilize it with a 2 percent formaldehyde solution. If there are other plants growing in the greenhouse, remove them before treatment.

Crown gall: crown gall is a bacterial disease which causes gnarled tumorlike growths at the base of the stem. Infected plants are not seriously harmed, however, and the disease can be safely ignored.

Dead arm: this disease can be recognized by elongated black spots on the lower parts of young shoots and on the leaves. It is most serious in spring when it attacks the base of the shoots near to the main stem—and can effectively kill the whole shoot. Since the disease spends the winter as a sporing body on the vine, spraying the vines with a dormant oil in the winter is the best precaution. If, despite spraying, the disease is noticed in the spring, spray with an approved fungicide.

Splitting: split berries are usually caused by irregular watering. Water the vines regularly during the season.

Powdery mildew: the symptoms of this fungal infection are very pale powdery patches which appear on the leaves, young canes and grapes. Powdery mildew tends to occur in wet autumns following hot dry summers. Avoid overcrowded foliage, as this encourages the disease. The best precaution is spraying with an approved fungicide at the end of blossoming period and again two weeks later.

Downy mildew: this usually appears later than powdery mildew, after blossoming time. If the leaves are infected, the upper surfaces will look as though they have oil spots on them and thick, pale gray down will appear on the leaf undersides: infected fruits will turn brown and fail to ripen. Spray as above in early, mid and late summer.

Anthracnose (black spot): this disease affects many garden plants and can travel from other plants to grapevines. It is usually associated with warm, damp, close conditions. If the canes are infected, brown spots appear which eventually merge into each other. Light brown spots may also appear on the leaves or berries: the spots later turn red

GUIDE TO GREENHOUSE GRAPE TROUBLES

Symptoms	*Probable cause*
White powdery patches on leaves, young rods and grapes	Powdery mildew
Thick gray down on underside of leaves, fruits turn brown and do not ripen	Downy mildew
Brown spots on leaves or berries	Anthracnose
Brown, sunken patches on berries	Scald
Yellow and/or plum red discoloration of leaves which turn brown and wither	Magnesium deficiency
Spots on berries containing rings of fungus	Rot
Small galls on leaves, larger ones on roots	Phylloxera
Grayish speckled or yellow leaves with tiny pale red insects on the undersides; webbing present	Red spider mite
Pale green curled leaves, shoot tips distorted	Aphids
Small dark brown, raised spots on bark and on undersides of leaves; sticky bark and leaves, sometimes black patches on leaves	Scale insects
White or gray, cotton woollike fluff on stems	Mealy bug
Furry gray growth on berries and foliage	Botrytis
Stems at base of plant rotten with white, fanlike growth of fungus beneath bark, black shoelacelike threads in soil, honey-colored toadstools around stem	Honey fungus
Gnarled, tumorlike growth at base of stem	Crown gall
Elongated black spots on leaves and young shoots, buds fail to burst in spring	Dead arm
Ripening berries cracked	Splitting

with dark margins and the dead tissue may fall out leaving holes in the leaves. Burn all prunings from infected vines, so the disease does not spread. If your vines are infected, apply a dormant oil spray.

Phylloxera: this insect has a very complicated life cycle, but is most damaging when it eats the roots of grapevines which leads to the death of the plant. At one stage in its life cycle, it lives on the leaves and makes small galls in which the grubs develop; these galls are the main above-ground symptoms. Grafting European varieties on stronger American rootstocks has greatly diminished damage by phylloxera.

Scald (sunscald): this is a physiological disorder due to excessive moisture on the berries during hot weather. Affected berries become scalded looking and sunken, usually at the top of the berry. Avoid overcrowded growing conditions and provide adequate ventilation to minimize sunscald damage.

Magnesium deficiency: if there is a lack of this trace element in the soil, leaves will turn yellow or orange between the veins. Eventually the discolored area becomes brown and dies. Mulch with well-rotted garden compost or other bulky organic matter. You can also correct the deficiency by spraying with 8 oz (240 g) of magnesium sulfate in 2.5 gal (11 L) water.

Rot: this disease is caused by a fungus. It appears as spots on the berries; in the spots are rings of fungus pustules. Avoid overcrowded conditions and keep the air circulating freely around the plants. Remove any diseased berries to reduce the risk of further infection. Spray with an approved fungicide.

Get to Know Basil

Spicy and deliciously aromatic basil will thrive in pot or herb garden and give you fresh green leaves for your Indian and Italian dishes.

Really fresh basil leaves are a tasty and fragrant addition to a variety of dishes, and to get this superb flavor you will have to grow the plants yourself. The dried basil you get in the shops bears little resemblance to fresh leaves, which are almost impossible to buy. Sweet basil (*Ocimum basilicum*) originated in India, where it is considered to be a plant sacred to the gods. There it grows up to 3 ft (90 cm) tall but in cooler conditions it is 1½–2 ft (45–60 cm). It also grows wild in the Mediterranean area, where its spiciness is most appreciated. Although it is a tropical plant, it will grow outdoors in temperate climates where it is treated as a half-hardy annual. There is a variety of sweet basil called Dark Opal which is ornamental as well as useful, since it has deep purple leaves, although this is hard to come by. In a cooler climate, you might want to try a slightly hardier type, bush, or dwarf, basil (*O. minimum*), which grows to 6–12 in (15–30 cm).

Choose a warm, sheltered spot in your garden for basil. The soil should be light, rich and well-drained. Before sowing, dig the soil well and add well rotted garden compost, peat or leafmold.

Basil is usually grown from seed sown in midspring. Although you can sow directly into the ground, it is advisable in cooler areas to sow under glass in early spring and plant out in late spring. If sowing under glass, place two or three seeds in a 2 in (5 cm) pot filled with a good quality potting mixture. If you maintain the temperature at a constant 60° F (15° C), germination should take place in about two weeks. Thin the seedlings to one in each pot and gradually harden them off until planting out in late spring. Plant the whole root ball of the seedling without breaking it up. Plant out at a spacing of 8 in (20 cm); this is also the correct spacing for seed sown directly into the ground. If it is chilly, cover plants with protective covers at night.

Basil is a relatively carefree plant, with minimal cultivation requirements. Water the bed in dry weather, and hoe to keep down the weeds. In midsummer, pinch off the flowers and stem tips to encourage a leafier plant. You should always leave at least two pairs of leaves on the plant when you do this, as the bottom pair of leaves is always dying off.

You should be able to cut fresh basil leaves as you need them throughout the summer. Always pick leaves from the top of the plant. Basil is used in many Indian and Italian dishes; try it in recipes for tomatoes, cheese, eggs or fish. Unlike most herbs, the flavor of basil becomes stronger in cooking, so use it more sparingly in cooked dishes than in salads or other cold dishes.

You can also cut leaves of basil for drying. Cut off the leafy stems just before the plant flowers in midsummer. Tie them in bunches and hang them upside-down in a dark, warm, dry place. When they are dry, crumble the leaves and store them in a tightly sealed jar for use through the winter.

Keep in mind, though, that dried basil will never give you the marvellous spicy flavor of the fresh leaves. If you have a taste for fresh basil, you might want to

prolong the cutting season by growing a pot or two on your windowsill. Basil normally dies in the autumn in temperate climates, but with great care in a warm place you may be lucky enough to nurse a plant through the winter and into the following spring. Bush basil grows particularly well in pots. If you would like to try, lift a few of the outdoor plants very early in autumn, cut them back to just above the lowest pair of leaves, and pot them singly in 5 in (12.5 cm) pots of good potting mixture. Put them in a light, warm place.

You can buy potted basil plants, or you can grow your own from seed. Sow in early spring, two or three seeds to a 2 in (5 cm) pot, exactly as you would for seedlings to be planted out. When seedlings are large enough to handle, thin them to the largest one in each pot and transplant into 4 in (10 cm) pots filled with a good quality potting mixture. Place the pots in a saucer of water, and always water from the bottom as pot-grown basil does not like water on stems or leaves. Keep the pot on your sunniest windowsill, and turn it around toward the light every other day. Basil is a pretty and useful herb to have in the kitchen, and its delicate aroma will fill the room when the breeze blows the leaves. When autumn comes, cut the plants back by about half to stimulate new growth.

Harry Smith

▲ *Well-grown basil plants are a fragrant and useful addition to any herb garden.*

growing ideas

Two Traditional English Herbs

Cucumber-flavored borage and delicate, lemony balm are two of the prettiest plants you can choose to grace herb garden or window box.

Brian Furner

Borage in flower is one of the loveliest sights in the herb garden. The bright blue flowers—which appear from midspring to midsummer, depending on the time of sowing—can be eaten fresh in salads, or candied and used to decorate cakes and sweets.

Borage and balm are two of the loveliest and easiest to grow of all herbs. Both are happy in virtually any soil or in any site, and both will grow equally well indoors or outdoors. Try them both, for carefree plants and refreshing flavors for summer drinks.

Borage (*Borago officinalis*) is a hardy annual which grows to between 1–2½ ft (30–75 cm) high. The heavily veined, deep green leaves and hollow, rounded stems are very rough and hairy, and both have a cucumberlike flavor and fragrance although it is only the leaves which are used. The flowers are star-shaped and intensely blue; they are produced in abundance and are extremely attractive to bees. If your garden is sheltered and in a warm climate, borage might flower right through the winter, although a heavy frost could kill it.

A singularly unfussy plant, borage will grow in sun or shade, whether in bank or border, rock or herb garden, and in any type of soil. Sow the seed in early spring, but just before sowing, fork the soil deeply so that the long taproot can grow unimpeded. Sow the seeds thinly in narrow drills, and cover with about ½ in (1.3 cm) of soil. When the first pair of true leaves is well developed, thin the seedlings to a final spacing of 1 ft (30 cm) and firm the soil well around the remaining plants. Do not try transplanting the thinnings, as this is rarely successful.

Borage is as unparticular about its cultivation as it is about site and soil. A minimum of care is needed, merely watering during dry weather and a light hoeing between plants to keep the soil friable and weed-free.

You can cut the leaves, starting at the bottom of the stem, from early to midsummer onward. Use them fresh to add a refreshingly different taste to salads, or to give an exhilarating lift to your summer drinks and punches. Remember that the flowers are also edible; use them for a beautiful touch in special salads, or candy them to use on cakes and desserts. The flowers are also attractive in flower arrangements or can be dried to provide a touch of blue in potpourris.

Borage reseeds itself freely, and it can be a nuisance if allowed to do so. Cut the seed heads before the seed has a chance to disperse, and save it for planting the following spring.

To grow borage indoors, fill 5 in (12.5 cm) containers with good potting soil and sow the seed anytime in the year. Keep the pots in a reasonably light and warm place, and you will have fresh borage leaves for cutting in about three months.

Balm (*Melissa officinalis*), like borage, will also grow well in any site and soil, although it needs protection from both severe frost and high temperatures. It is best to start balm from a young nursery plant, either in midspring or midautumn. Since balm has spreading, invading roots, it is a good idea to sink a bottomless pot or bucket or a piece of drainpipe in the site before planting. This will prevent the roots from getting tangled with neighboring plants.

If you cannot get young plants, you can grow balm from seed. Sow the seed

planting balm in a bottomless bucket

in midspring, in drills about ½ in (1.3 cm) deep. The young plants should appear in three or four weeks; when they are large enough to handle thin to a spacing of 1 ft (30 cm) apart.

When your plants are established, you can propagate new plants by root division in spring or autumn. Space the root sections 1 ft (30 cm) apart in soil which has been dug over and treated with well-rotted garden compost.

Balm requires as little care as borage. Water it well in dry weather, weed occa-

Harry Smith

▲ *Certain types of balm have golden yellow leaves which are attractive and very fragrant.*

sionally, and keep a particular watch for any unwanted balm seedlings. An established balm plant will set a lot of seed, so weed out any seedlings before they become a nuisance in your garden by taking it over.

Leaves for use in sweet dishes, in cool summer drinks or for a refreshing tea can be picked as required throughout the spring, when they are at their most tender. They can be used generously, as their flavor is delicate. They are also good with salads, and mixed with pea and bean soups. After the plant produces its small white flowers in early summer, the leaves begin to toughen. Unlike borage leaves, balm leaves can be dried. Cut the leaves between early and late summer, hang them in a dry, dark place at a temperature of no more than 100° F (38° C) until thoroughly dried, and store them in an opaque, airtight jar. In autumn, cut the stems down to the ground, and if your garden gets a lot of frost, protect the plants with straw. Balm is one of the earliest plants to begin growing again in spring—so hold it back.

Balm plants can be grown in pots, tubs or windowboxes, as long as they are kept well-watered. A pot of balm will grow well indoors on a sunny windowsill, and it is a useful fresh herb for bringing a lemony, summery taste to winter dishes and drinks.

growing ideas

Aromatic Caraway

Caraway is an aromatic plant grown for its flavorful seeds—used in cooking, baking and candy-making.

A biennial member of the *Umbelliferae* family, caraway (*Carum carvi*) is a doubly useful herb. The fragrant and tasty seeds have long been used in breads, cakes, sweet dishes, with vegetables, or in traditional baked apple deserts. The young leaves can be used fresh in salads or substituted for parsley, and as an extra bonus, the tap roots can be dug up and cooked like parsnips or carrots.

The name caraway comes from an Arabic word meaning seed, and the seeds have been used since very ancient times. The plant is found wild throughout Europe, North America and parts of Asia. In cultivation, caraway is a thoroughly undemanding plant, unaffected by either dry weather or frost, and quite happy to grow in herb garden, windowbox or pot.

Caraway takes two seasons to complete its life cycle. In its first season it grows to about 8 in (20 cm) high, its feathery shoots resembling pale green carrot tops. The cycle is completed the next year, when the flowering stems of the plants reach about 2 ft (60 cm) and produce white, umbellike clusters of flowers, which become the seed heads. It is for these seeds that caraway is most often grown.

To grow caraway in your herb garden, choose a semi-shady site. The plants do not need much water, so they should never be put into soil which stays damp for long periods. The best soil is fine, sandy and well-drained. If your garden is on heavy soil, dig in a mixture of sand and peat or compost before sowing.

Sow outdoors either in midspring or in late summer. Put the seed very thinly in drills 1½ ft (45 cm) apart. Germination should take about three weeks; when the seedlings are large enough to handle, thin to a spacing of 1 ft (30 cm). Always sow caraway where it is to grow, as the long taproots do not transplant well. Spring-sown plants will flower in late spring of the following year, while autumn-sown plants will reach maturity in the following midsummer.

Caraway is a trouble-free and easy-to-care-for herb. The plants need no special feeding or care, other than keeping the bed free of weeds. If the weather is very dry, keep the plants moist by watering with a fine-rosed watering can every two or three days. However, do not saturate the ground, as caraway is not a moisture-loving plant. Protect the plants by mulching over the crowns during the winter.

You can take cuttings of caraway leaves beginning eight weeks after planting. Cut sparingly, and only take as many leaves as you can use fresh at that time; dried caraway leaves have very little flavor. Do not cut the leaves in the second year.

Caraway is primarily a seed herb, and the seed should be ready for harvesting in the second summer, after flowering and when the stems begin to discolor and the seed is dark green. Cut the seed heads carefully, put them into paper bags and hang them in a warm, dry place until the seeds fall. Alternatively you can put the seed heads in a single layer on a tray, and dry them in a barely-heated

Marshall Cavendish Clay Perry

Producing an aromatic seed which has a wide range of uses in the kitchen, caraway is an easy, undemanding plant to cultivate and is attractive enough to be grown in the flower garden.

oven, shaking them occasionally. If you leave the seed heads on the plant for too long, the seeds will fall and be lost in the garden, so keep a close watch on your plants.

To store caraway seeds, first be sure they are thoroughly dry. Keep the seeds in an opaque, airtight container, preferably glass, and keep the container in a dark place. When properly stored, caraway seeds will keep their pungent flavor for at least a year.

After the seed heads have been cut, you can dig the slender taproots and cook them. Put any remains of the plants on the compost heap. Once caraway has been grown in the garden, you will always have it, as it self-sows very easily. It pays to look after these plants though, by keeping them fed and watered, otherwise the seed crop will be poor.

Caraway is a good choice for container growing, as long as the container is deep enough for the taproots to develop. Sow two or three seeds in the pot where the plants are to grow, and discard any weak seedlings. Use a good potting soil. Then treat the plants exactly as you would outdoor-grown caraway.

If you have a large harvest of caraway seeds, you might want to add some to herb bags or potpourris.

growing ideas

The Super-simple Herb

Pretty chervil is one of the easiest herbs to grow. With little effort you can have sweet, fragrant leaves for flavoring throughout the year.

Chervil (*Anthriscus cerefolium*) is a hardy annual herb of the *Umbelliferae* family. Its feathery, bright green leaves make it one of the most attractive pot herbs to grow, and it grows equally well in garden or container, indoors or outdoors.

There are two basic varieties of chervil, curly-leaved and smooth-leaved. The curly-leaved type is the most popular and has the best flavor. Although the smooth-leaved variety is just as easy to grow, the taste is not very strong, so it is a good idea to specify a curly-leaved variety when ordering your seed.

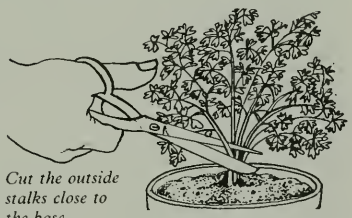
Often compared with parsley in both appearance and flavor, chervil is considered to be the superior herb by many. The flavor is peppery and slightly sweet, with a delicate hint of aniseed. The leaves look rather like parsley, but are more curled. Chervil is extremely useful in the kitchen, either fresh or dried. Fresh leaves are used for chervil soup, while the dried leaves give a subtle and delicious taste to egg and potato dishes, salads and sauces. Chervil, along with parsley, chives and tarragon, is a chief ingredient in the classic *fines herbes.*

Chervil grows best in semi-shady conditions, so choose a site in the garden which gets sun for only part of the day. In full sun, the plant flowers too quickly, and this destroys the flavor of the leaves. Any well-drained soil is suitable. The bed requires no special preparation.

The plants are usually raised from seed. Make several small sowings in succession from early spring to early summer, and again in early autumn. After the last crop of leaves in autumn, the plant will be dormant until spring.

Scatter the seed in rows on top of the soil and rake over the surface lightly. If you plant more than one row, allow 1 ft (30 cm) between each row. Germination should take place within 7–10 days. Thin the seedlings first to 6 in (15 cm) apart, and then to 1 ft (30 cm) apart.

Chervil requires virtually no special care or cultivation. Keep the plants well watered. They require no special feeding, and the lush green bed rarely needs any weeding.



Cut the outside stalks close to the base

You can make your first cuttings when the plants are about 4 in (10 cm) high. As the plants are very delicate it is better to use scissors than to pick the sprigs by hand. Take stalks from the outside of the plant, cutting the stems near the base. New sprigs will grow from the center to replace them. They will continue to produce new leaves.

Marshall Cavendish

Chervil grows equally well indoors and outside. A pot of this pretty herb will brighten any windowsill, and the leaves will be close at hand for cutting.

The plants will grow to a height between 1–1½ ft (30–45 cm) before producing their umbrellas of tiny white flowers. It is important to keep in mind that the production of flowers in summer will impair the flavor of the leaves, so cut back the flower buds as soon as they form. If you want to save your own seed, allow one plant to flower and save the seed. Dry the seed carefully and store in a cool, dry place until ready for sowing.

Chervil is excellent for growing in large pots or containers. Choose a container and fill it with a good quality potting mixture to 1 in (2.5 cm) of the rim. Line the base with gravel or broken clay pots to be sure of adequate drainage. The seeds can be sown in containers at any time of the year. Sprinkle the seeds over the soil and cover with a bit of soil. Keep the container in a fairly warm, partially shaded place, either indoors or outdoors. Your chervil should be ready for cutting in a few weeks. As with outdoor chervil, make successive sowings in containers to insure a supply of fresh leaves for cutting throughout the year to be on hand for your pleasure.

Chervil leaves wither very rapidly and quickly lose their aniseed flavor, so cut them immediately before use in the kitchen. You can also dry and store some of the leaves. Unlike most herbs, which are simply hung upside down in bunches to dry, chervil dries most successfully with a short, sharp blast of heat. Put the leaves in a basket or tray, and place this over a low heater at night. By morning the leaves should be crisp. Rub them together to a fairly fine texture, and put them into an opaque, airtight container, ready for use in the kitchen. This should last over the winter months when your plant is not producing fresh leaves. As soon as the dried herbs start to discolor it is a sign of staleness.

You can also preserve chervil by salting. Place leaves in thin layers in a glass or stone jar, and sprinkle each layer with salt. Keep in a glass jar out of the light. The chervil should keep fresh and flavorful for several months.

growing ideas

An Authentic Eastern Flavor

Grow this attractive herb for its spicy seeds which make a delicious addition to your curries, relishes and desserts.

Coriander is a hardy annual herb, a member of the *Umbelliferae* family, which includes a number of herbs such as caraway and dill. One of the most ancient of the cultivated herbs, it was brought to Britain by the Romans, who had a high regard for its uses as a cooking and preserving spice. Coriander thrives in climates that are not too severe, and can often be found growing wild along banks of rivers and streams. However, the cultivated sort produces seeds of better flavor, as well as higher yields.

Coriander is extremely easy to grow. It prefers a light, warm, rich soil, but it can

Coriander foliage. This pretty herb is grown for its leaves and for its highly flavored seeds.

Bruce Coleman Ltd. Jane Burton

succeed in most sites so long as the ground is well-drained. It is a sun-loving plant, so choose a spot in your herb garden where it can have full sun for a good part of the day.

Propagation is from seed. Sow them in drills ½ in (1.3 cm) deep and 1 ft (30 cm) apart, either in early autumn or in midspring. It is best to sow the seed where the plants are to remain, but if you like you can extend the season by sowings in a heated greenhouse in early spring and planting out in late spring. When the young plants are established, thin them to a spacing of about 8 in (20 cm) apart.

thinning the young plants

The plants require very little care. Keep the bed free of weeds and for best results, water if the weather is very hot or dry. Your coriander should flourish, producing plants up to 1½ ft (45 cm) high, with deeply divided, shiny, bright green leaves on upright stems. You can cut the leaves when they are young and use them as a fresh new taste to add to salads, or in any way you might use parsley. Coriander is a close relative of parsley, and the leaves are sometimes sold under the name of Chinese parsley. The taste is a bit stronger but, unlike parsley, they do not dry or store very well.

It is really for the seeds that coriander is grown. Hence, it is one of those herbs that is encouraged to "go to seed." The small, delicate white or mauve flowers appear in early summer. These are borne in umbels of five to ten flower stalks, springing from a common point, like the ribs of an inside out umbrella.

The seeds are produced after the plant has flowered. Before the seeds are ripe, usually about late summer, the plant develops a disagreeable smell. The odor disappears as the seeds ripen, however, and the coriander becomes pleasantly aromatic.

Watch your plants carefully in late summer, because the seeds tend to fall as soon as they are ripe. Ripe seeds are hard and round and reddish-brown or beige in color. When grown on a large scale, coriander is reaped with a sickle, but for small quantities shears or scissors are the right tool.

Cut the stems close to the ground and tie them in bunches. Dry them in a warm, dark, airy place, hanging them over sheets of paper or a large bowl to catch the seeds as they fall.

Alternatively, you can shake the seeds free from the seed heads just after cutting, and dry them on trays in the sun or on baking trays in a cool oven.

harvesting the seeds

Coriander seed should be stored in opaque, airtight jars. The flavor of coriander is rather orangelike, and it is indispensable to many Middle Eastern and Indian dishes. Use whole seeds in breads, rice dishes, curries, relishes and pickles. Freshly ground seed adds an interesting flavor to custards, and is included in a number of recipes for spicy cakes and pastries.

growing ideas

Herbs for Fish

Enhance your fish dishes with fennel or dill, freshly picked from your herb garden.

Fennel and dill are both herbs of distinctive flavor, and both are grown for their leaves and seeds. They are similar in appearance and needs, and both will grow happily under most garden conditions.

Fennel (*Foeniculum vulgare*) is a very attractive perennial herb with upright, branching stems and fine, threadlike, dark green leaves. Fresh or dried, the leaves are used as a flavoring in many dishes, in sauces, and are one of the classic and most delicious accompaniments to fish. The seeds, which have a slightly stronger, licorice taste, can be used in the same dishes, and they add an interesting flavor to pickles.

To grow fennel in your garden, choose a sunny position, preferably at the back of the border because the plants grow so tall, up to 5–6 ft (1.5–1.8 m) high and 2 ft (60 cm) across. Do not grow it anywhere

Bernard Alfieri

The feathery, fragrant leaves of fennel, ready for cutting. The delicate foliage should be ready for harvesting about six weeks after the first sowing.

near dill though, as the two herbs will cross-pollinate easily and produce seeds of no distinctive flavor.

Any good, well drained, deep soil will do for fennel. Fork the growing area well to break up the subsoil, and incorporate peat or well-rotted garden compost to help retain moisture. Sow the seeds thinly in midspring about ¼ in (0.5 cm) deep, in rows 1½ ft (45 cm) apart. Germination should take place between two and three weeks. When the seedlings have produced a central, feathery leaf, thin them to a spacing of 1½–2 ft (45–60 cm) apart.

Like most herbs, fennel requires little care during the growing period. Water the ground regularly in dry weather until the plants are established, and keep them free of weeds. If the site is exposed, stake the plants as they grow to keep them from being blown over by strong winds.

Young leaves for cutting should be ready about six weeks after sowing. Cut leaves as you need them from near the base of the plant, or cut them in large bunches and hang them to dry in a cool, airy place. Harvest leaves until the first flower buds appear, but remember that plants grown from seed will not flower until their second year.

From midsummer to early autumn, fennel bears yellow umbels of flowers, which will produce a large quantity of seeds. If you do not want seeds, remove the flower heads to encourage leaf growth. If seeds are required, leave the flower heads on the plants, and harvest them in early to midautumn, just as the seeds start to turn brown. Cut the seed heads and hang them over paper in a dry place, or shake them carefully over a bowl and then finish the ripening by putting them in single layers in a dry, barely warm place. Drying the delicate foliage is rather difficult to do satisfactorily: it needs to be done very slowly, in the dark, and at the lowest possible temperature. You can also preserve fennel leaves by freezing them.

The top growth of fennel will die down in the late autumn, and should be cut back to about 3 in (7.5 cm) but the plants will survive all but the coldest winters to sprout again in the spring. If you like, you can lift some plants in early autumn, put them into large pots of good soil mixture and keep them indoors or under glass. They should continue to grow through the winter, but do not expect to harvest many leaves.

Like fennel, dill (*Anethum graveolens*) is also very easy to grow in ordinary soil and in any open, sunny site. It is an annual, so is always grown from seed. Prepare the site by deep digging, as dill's tap roots must be allowed to grow unimpeded.

Sow the seeds outside in midspring, not more than ¼ in (0.5 cm) deep and as thinly as possible. Germination should take about two weeks. The seedlings emerge with a pair of narrow leaflets, often with the seed shell affixed to one, and with the curled growth bud in the middle. Once the seedlings are large enough to handle, thin them to a spacing of 4 in (10 cm). Continue to thin the developing plants until they are approximately 9 in (23 cm) apart; the thinnings can be used fresh or dried like other herbs. Remember to firm the remaining plants after thinning.

Seedlings and young plants should not run short of water, but mature plants with their long tap roots will not need to be watered much unless the weather is very dry. Be sure to keep the bed weed-free, and, if your garden is in an exposed or windy area, support the plants with twigs when they reach about 2 ft (60 cm). Most plants, however, will grow well without supports.

The feathery, green leaves of dill grow on a single stem which reaches between 2–3 ft (60–90 cm) high and the plant produces large yellow, umbrellalike flower heads from mid to late summer. You should harvest the leaves before the flower buds appear, which is usually about eight weeks after sowing. Cut them as for fennel and use them fresh in the same way. You can also dry dill leaves but very carefully, handling as little as possible, and using a temperature

Harry Smith

▲ *The creamy yellow flowers of dill appear in summer; do not cut the flower heads.*

no higher than 98° F (37° C); then store in an airtight container.

However, it is primarily for its aromatic, slightly bitter seeds that dill is grown, so do not remove flower heads from the plants. Allow the seeds to ripen until they are dark brown, and be ready to harvest them quickly, as they fall readily once ripe. Cut the seed heads carefully and hang them over paper in a warm, dark place. Another method is to shake them into a bowl like fennel seeds. Again be sure the seeds are thoroughly dry before storing them in an airtight container.

As dill is an annual, dig up and compost your outdoor-grown dill plants when you have finished harvesting the seed heads.

Dill is a good choice for an indoor winter herb. Sow seed in midautumn in 3 in (7.5 cm) pots, and keep them in a warm greenhouse or indoors. Then when large enough to handle and when the plants are 6 in (15 cm) tall, transplant to larger pots using a good quality soil. Keep the plants away from direct sunlight and radiators, water them regularly and support with sticks, and you should be able to harvest dill leaves through the winter.

Although dill seeds are often used as a tasty addition in various pickles, try them as well in cooked vegetable dishes, especially brassicas, with boiled potatoes, in soups or with soft cheeses and, of course, with fish. They have a pungent flavor, so use them sparingly. The leaves are delicious in any dish where fennel leaves are used. Or try both herbs together for an unusual flavor.

Unfortunately, aphids have a great fondness for both fennel and dill, particularly if the weather is dry. Dig up and burn badly infested plants, and spray the remainder with soapy water. Do not spray with insecticides, which might affect the flavor of the herbs.

growing ideas

Flavorful Garlic

One of the most distinctive and popular of all flavorings, garlic is simple to grow, easy to store, and an ideal crop for any gardener.

Garlic (*Allium sativum*) is the easiest-to-grow member of the onion family. A perennial herb, it is grown for the aromatic cloves which make up the bulbs. A clove or two of garlic gives an intense flavor and characteristic aroma to a variety of dishes. In fact, the flavor of garlic is so powerful that simply cutting a clove in half and rubbing it around the sides of the serving dish or cooking pot will be enough to flavor the food.

Garlic is thought to have originated in central Asia, and it spread from there to the Mediterranean region, then throughout Europe and across the ocean to America. Today it grows virtually everywhere, since it is not particular about climate, site or soil. Because it is so easy to grow and care for, garlic is a welcome crop for the busy gardener and an ideal choice for the beginner or for children.

Brian Furner

▲ *Well-developed garlic plants; garlic needs very little cultivation, apart from occasional hoeing. Water only in long dry spells.*

A garlic bulb contains up to 20 individual cloves, all arranged concentrically and each covered in a fine layer of paper white skin. The bulb itself is covered in several layers of the same skin, and it measures 1½–3 in (3.8–7.5 cm) in diameter, on average. However, bulbs measuring up to 8 in (20 cm) high are not unknown, although they generally have a poor flavor. The cloves are roughly ¾ in (1.9 cm) long; they are wedge-shaped, rounded on the outside and pointed at the top.

Garlic for planting does not have to be ordered specially. Simply buy a fresh bulb from your grocer or supermarket. But, if you prefer, you can choose one of the special large-cloved, mild-flavored types which are offered by many seed companies.

Midautumn is a good time to plant it in mild climates; but if your area is subject to heavy frosts, hold off planting until early or midspring. Choose a sunny spot in your garden, or a windowbox or pot in a sunny window.

A rich, sandy loam is best, although it will thrive in any reasonably good soil. Good drainage is especially important in areas where it must survive winter rain. It is a good idea to mix in well-rotted garden compost some weeks before

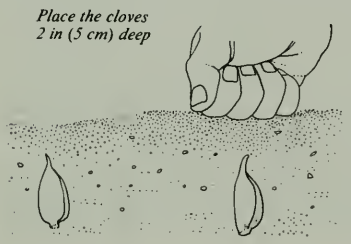
Brian Furner

▲ *When the bulbs are thoroughly dry, plait or braid them together for hanging on a wall.*

planting, and to make an application of bone meal at the rate of 2 oz per sq yd (60 g per sq m) about a week before planting.

Garlic is much hardier than is generally realized.

Just before planting, rake the surface down finely. Separate the garlic bulb into cloves, but do not remove their papery skins. Your best results will be from the large cloves at the outside of the bulb, especially if you are planting in autumn. Place the cloves about 2 in (5 cm) deep, base down and tip pointing upward. There should be 1 in (2.5 cm) of soil over the tip; vary the planting depth according to the size of the cloves. Allow 6 in (15 cm) between cloves and 1 ft (30 cm) between rows.

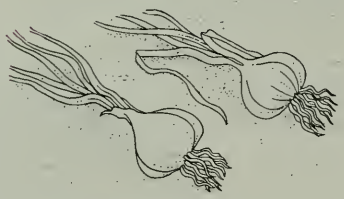


As a crop, garlic is virtually carefree; all you need do is hoe out any weeds that appear. Watering is not essential unless conditions are extremely dry. Garlic produces fine, hollow rounded leaves, like other members of the onion family, reaching about 1½ ft (45 cm) in height, and it may be necessary to support them by tying them to a cane to keep them from falling over on the ground.

A light dressing of a complete fertilizer high in potash in midspring and another which contains mainly nitrogen in midsummer will do much to help the production of large cloves and bulbs.

Garlic is ready for harvesting when the leaves begin to wither and turn yellow, usually from late summer to early autumn. Do not pull the bulbs out of the ground, which may cause them to break up. Use a small fork to dig them out and lift them carefully. After lifting, leave the bulbs on the ground to dry in the sun for a few days. Cover them at night to protect them from the dew. If the weather is wet, take the bulbs inside to dry in an airy room or shed.

drying garlic



When the bulbs are thoroughly dry, clean off any soil and loose skins, but do not remove the outer skin completely. Bunch the bulbs together by tying the stems with string. You can leave the bunches on a tray or shelf in a frost-free place, or you can string the bulbs for hanging on a wall by braiding or plaiting them together. Properly stored garlic will last for at least a year.

growing ideas

Add Some Height to Your Herb Garden

Lovage is related to wild celery and is similar in appearance, taste and smell. This tall, showy plant makes a magnificent addition to any garden.

This hardy perennial herb is a native of southern Europe, and now grows wild in some parts of northern Europe, England and Scotland. The upright, bushy plant can reach a height of 6 ft (1.8 m) or even more, with a width of about 4 ft (1.2 m). Its thick, hollow stems produce dark green, glossy leaves, and in mid to late summer, flat clusters of greenish-yellow flowers appear, followed by highly aromatic hollow seeds which turn brown when ripe. Although the plant dies down in winter, it can withstand fairly severe weather, and may be left in the same site for several years.

Many gardeners have been discouraged from growing lovage because it is a slow starter: the seeds can take weeks, sometimes months, to germinate, and the plants reach their full height only after about four years or more. Patience and perseverance will be rewarded, however, for the mature plants are showy and tall, and will look magnificent at the back of any herb garden.

Lovage is an extremely economical herb, since most parts of the plant are edible. It has a pleasant yeasty flavor, and may be used as a substitute for celery when this vegetable is out of season. The leaves make excellent salad greens, and you can also use them sparingly, either fresh or dried, to flavor casseroles, stews and soups. The seeds, either crushed or whole, can also be used as flavoring. Treat the stems like those of celery, eating them raw or slicing them up and adding them to cooked dishes.

Lovage will grow in sun or in a spot that is shady for part of the day. A rich, well-dug and well-drained soil will give the best results—it should contain sufficient nutrients and moisture to keep the deep, slow-spreading roots growing strongly, and to provide for the plant's needs throughout its long growing period. If possible, the soil should be about neutral. Heavy clay soils are the least suitable type. You can improve light, quick-draining soils by forking in damp peat or leafmold; this will not only increase their organic content, but it will also help them to retain more moisture.

You can grow lovage in three different ways: you can raise it from seed, propagate it by root division, or—the easiest way of all—you can set out young lovage plants which you have bought from a nursery.

If you decide to raise the herb from seed, you can either sow it in spring or autumn, in a seed tray or where the plants are to grow. Ripe seed should begin to germinate within 10 days. Since the seed is slow to germinate and since germination is most successful in cool conditions, the best plan is to sow the seed in a tray in late summer or early autumn, putting it in a cool, dark place for best results. The seedlings can then be planted out into their final growing positions in midautumn. Spring sowing is also possible, but it is much slower and less reliable.

Always sow lovage seed as soon as possible after ripening: the newer the seed, the better the rate of germination. After sowing, sift soil mix finely over the seed and then cover the tray to keep the

mixture dark, moist and cool until germination occurs. Maintain a temperature of about 40°–50° F (4°–10° C). As soon as the seedlings are large enough to handle, move them to a larger container and then, either in midautumn or in spring, set the young plants out 3–4 ft (90–120 cm) apart in their final positions in the herb garden.

If you decide to propagate lovage by root division, you should do this in early spring or early autumn. Lift the plant and cut the roots into pieces, each with a bud. Plant each root piece 2 in (5 cm) below the soil.

Care of the herb during growth is relatively simple. Be sure to keep it well-watered. Although lovage is normally sturdy enough not to need support, you may have to stake it if you grow it in a very exposed position.

If you want to eat the stems, you should blanch these first. Do this more or less as you would for celery.

Lovage can be harvested at any time, and you can obtain three crops in one season by cutting the plants back to 7–8 in (17.5–20 cm) from the ground three times during the year in late spring, midsummer and again in late summer. When picking either leaves or stems, take only the outer ones: if you take from the heart of the plant, it may be greatly weakened.

The only pests you may encounter, especially in the early stages, are caterpillars, slugs, snails and aphids. These attack the young leaves as they uncurl. You can either remove the pests by hand or use a spray to control them.

Bruce Coleman

▲ *The yellow-green flower heads of lovage make it one of the most attractive plants in the herb garden.*

Harry Smith

◀ *Lovage will grow into a beautiful, shiny green, free-standing shrub up to 6 ft (1.8 m) high. It takes many years to produce a plant like this one.*

growing ideas

Make Room for Marjoram

The sweet and unusual aroma of marjoram makes it a favorite in the herb garden and the dried leaves give a marvelous flavor to a variety of dishes.

Marjoram is one of the most fragrant plants in the herb garden. Legend says that the plant was created by the goddess Venus, and the sweet scent and flavor came from her touch. The name marjoram is given to a group of plants which belong to the *Labiatae* family. All marjoram are of the genus *Origanum.* Those most commonly grown in herb gardens include oregano or wild marjoram (*O. vulgare*), pot marjoram (*O. onites*) and sweet or knotted marjoram (*O. majorana*).

Oregano or wild marjoram is the favorite herb in Italian kitchens. The plant is native to Europe, and it thrives on limestone soils in particular. A bushy perennial plant, it grows to about 2½ ft (75 cm) high. Oregano has small pale rosy-purple flowers in summer and gray-green leaves which it loses in winter. There is also a yellow-leaved form, "Aureum." The leaves of oregano are particularly pungent in flavor and aroma; only a small quantity need be added to the various savory dishes in which this herb can be used.

Pot marjoram is also a hardy perennial, but much smaller than oregano. It grows to a height of only 10 in (25 cm) and it tends to lie along the ground with the shoots producing roots at the leaf joints. Outdoors, the plant can cover a space at least 1 ft (30 cm) square, but it is an ideal herb for growing indoors in a large pot. Pot marjoram produces lovely purple flowers on 1½ ft (45 cm) tall stems in late summer.

Kay Sanecki

←*Sweet, fragrant pot marjoram produces lovely mauve flowers in late summer. The herb will thrive in garden or pot, and requires only a minimum of care and cultivation.*

Much more delicate than either of these types is sweet or knotted marjoram, which must be treated as a half-hardy annual in the more temperate climates. The flavor is much milder and more pleasant than the strong one of oregano, and is particularly good for enhancing meat dishes. Sweet marjoram grows to about 8 in (20 cm) high, with round gray leaves and clusters of minute white or pink flowers which grow from grayish green pealike buds in the leaf joints. The whole plant has a grayish tinge and is softly hairy.

All the marjorams prefer a light, well-drained soil in a site which gets full sun for most of the day. If the site is on clay soil, work in coarse sand or otherwise improve the drainage before sowing. Marjoram dislikes an over-acid soil, so apply lime if the soil is very acid.

Grow pot marjoram or wild marjoram in the same way, from seed sown outdoors in early or midspring. Take out drills ¾ in (1.9 cm) deep and 8 in (20 cm) apart, and sow the seed thinly. Germination should take place in two to three weeks. When the first three true leaves have formed, put the young plants into permanent positions, spaced about 1 ft (30 cm) apart.

Cultivation requirements are minimal for marjoram. Young plants must be kept well-weeded and well-watered, especially in dry weather. Older plants, however, are not so sensitive to drying out, although they will need watering in a drought.

From a spring sowing, marjoram leaves will be ready for harvesting just before the plants flower in mid- to late summer. Pick the leaves in the morning of a dry day, and put them to dry in a very dry, dark place, which is warm but not too warm. When thoroughly dry, store the leaves either whole or crumbled, in an opaque, airtight container. There may be a second, smaller crop of leaves before the winter.

Wild marjoram will lose all of its leaves in autumn, but the roots should survive a winter outdoors, to produce fresh shoots the following spring. Protect the plants with mulches or by moving them to a cold frame if the winter is unusually cold.

Pot marjoram can be lifted in early autumn after the best leaves have been picked and potted for winter use. Cut back the plants by about two-thirds before they begin to die down and, when new shoots begin to appear, pot them into a standard potting mixture. Keep the plants indoors during the winter in a warm, light position; you should have sufficient growth to provide fresh leaves as needed. Return them to the soil the following spring. You can, of course, keep the plant in its pot permanently (renewing the soil from time to time) and simply plunge the pot in a border for the summer, thus avoiding constant repotting and root disturbance. The plants may survive longer by this method, as they dislike repotting.

Cultivation for sweet marjoram is different from that of the other species, mainly because the plant is less hardy. Sow sweet marjoram in a seed flat in midspring, using a good quality seed mixture. You must be able to maintain a temperature of 60° F (15° C), so keep the seed flat in a frame or greenhouse until germination, which should take about one to two weeks. Pinch out the seedlings to a spacing of 2 in (5 cm) apart. They should be ready for planting out by early summer: space them about 6 in (15 cm) apart in a sunny, well-drained site into which manure has been dug.

Sweet marjoram tends to be slow growing, and the plants should be shaded from strong sunlight until they are established. Hoe frequently to aerate the soil and remove any weeds, but take care not to damage the plants with your hoe. Water well in dry weather. The leaves will be ready for cutting from midsummer, just before the plant flowers. Dry and store them like the other marjorams.

Sweet marjoram will not survive cold weather and does not do well in a pot. Dig up the remains of the plants in autumn and discard them.

growing ideas

Right Ways With an Old Favorite

Common mint is easy to grow in most gardens, but too often it runs riot and becomes an untidy nuisance. Here's how to grow really succulent mint and keep the plants firmly under control.

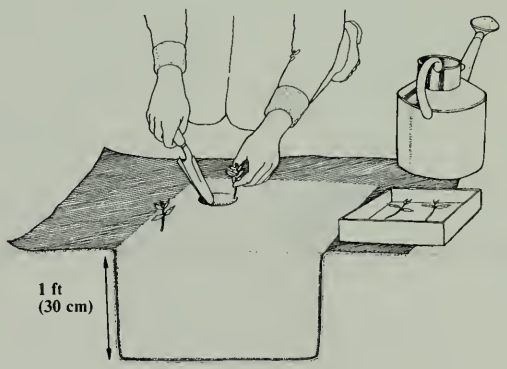
If you want a long and regular supply of mint, it is a good idea to plant two small beds, one in full sun and the other in a sheltered, shady site. The shady site will produce before the sunny site, so that you can make both early and late gatherings.

Mint will thrive in almost any situation as long as its roots are kept cool and damp. Leafmold or peat worked well into the ground is an excellent base; the beds will also benefit from a top-dressing of rich soil in autumn, or a top-dressing of well-rotted manure applied at the time of planting. If you are starting from scratch with mint, it is best to buy plants from a nursery or herb grower.

Start your mint bed in early to mid-spring, setting out the plants about 1 ft (30 cm) apart. Until new growth appears, keep the plants well-watered. If you want to propagate mint by taking cuttings, it is best to do this in autumn and bring them on under glass or in pots inside the house, ready for planting out in spring.

Pieces of rooting runners from an established plant can be taken in autumn or spring. These can go straight into the ground in spring, in drills about 2 in (5 cm) deep; otherwise bring them on inside over winter.

Mint has a tendency to send out underground runners which encroach on the territory of any other plants in the vicinity, so it is worthwhile taking special measures at planting time to keep the mint exactly where you want it. The best method of confining the roots is to dig a hole 1 ft (30 cm) deep and line it



Line the planting hole with black plastic to restrict spreading roots.

G. E. Hyde

▲ *Spearmint is the most popular of the mints used for cooking.*

with black plastic sheeting. Then return the soil, enriched with leafmold or peat, and plant the mint.

Take care to eliminate any weeds that appear; if they do get a hold it is difficult to untangle them from the mint. Mint grows rapidly and it will provide plenty of fresh leaves during the summer. If you remove the top cluster of leaves, this will encourage the stems to branch. If possible, top-dress the bed with manure after this first cutting.

The only major problem to be on the lookout for is rust. This fungus disease shows as powdery brown-red patches and spots on the undersurface of the leaves. If left untended it can eventually destroy the entire mint bed. There is no cure for rust; lift and burn any infected plants as soon as you see them, and do not grow mint in the same ground for several years. Also, never propagate from runners of infected plants.

Harvest mint just before the plant is about to flower, usually in late summer. Choose a dry day and cut the leaves close to the ground. Freshly cut mint is delicious with potatoes and peas, or in the traditional mint sauce, but you can keep it after picking. Tie it in bunches and hang in a cool airy place to dry.

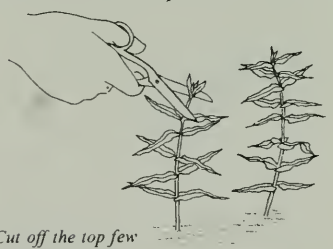
Mint can be happily transplanted, and in fact the mint bed should be completely replanted to a new site at least once every three years. This helps to keep the plants under control, and it also insures healthier plants and heavier crops.

Propagating mint by cutting pieces of rooting runners.

Plants left outdoors will die down during winter and begin a new growth in spring, but you can produce early growth by covering with glass in late winter. It is also possible to extend the season for fresh mint by lifting some roots before the first frost and planting these in a frame or greenhouse, where they will continue growing during the winter. If you want early supplies of mint you can force a few plants in a greenhouse or cold frame. Do this from pieces of rooting runners, planted in a good quality light soil mix in mid-autumn.

Like most herbs, mint is ideal for growing in containers or tubs outdoors, or in pots in your kitchen. Prepare the soil for tubs or containers the same way as for growing in the garden, using a rich light loam. A good potting mixture can also be used. Plant pieces of runners in midspring, or if you can get hold of seed you can sow it in midsummer. Never sow mint seed directly outdoors. Put the containers in a spot which has sun for at least part of the day. Pots of mint like a windowsill which gets either morning or afternoon sun. Remember to keep the containers well-watered, especially in hot, dry weather. Because mint tends to spread rapidly, give it a container to itself or it will crowd out other herbs. If you want to grow mint in a container or window box with other herbs, then the roots must be contained in the same way as in the garden. Line the planting hole with black plastic sheeting and plant the mint in that. Alternatively, you could plant the mint in a large, strong polyethylene bag filled with soil mix and put the bag in the container.

Planting the runners in a plant pot.



Cut off the top few inches of stem to develop a bushier plant.

Common mint or spearmint is the most familiar type of mint grown in American gardens, but it is worth giving some other types a try. Bowles' mint, or applemint, is good for cooking purposes, with its woolly leaves and rich flavor; this variety has flowers in pink spikes and is taller than common mint at 2½ ft (75 cm). Pennyroyal is a strongly flavored mint which is excellent for cooking. It makes good ground cover as it grows only 2 in (5 cm) high and has a creeping habit. Eau de cologne mint has a good aroma and purple-tinged foliage.

growing ideas

A Popular Herb

Everyone uses parsley in salads, soups and sauces and, if you grow your own, you can have a year round supply of this favorite herb.

Parsley is one of the most widely used of all herbs and can be a delicious addition to many dishes. Finely chopped, the fresh leaves feature in all sorts of recipes, while sprigs of it are used to garnish fish, meat and vegetable dishes. As well as being attractive and tasty, it is also an excellent source of vitamin C. Like all herbs, to be enjoyed at its best, parsley must be fresh from the garden or window box.

A member of the *Umbelliferae* family, parsley (*Petroselinum crispum*) is now so well known that some seed catalogs list it with the vegetables rather than with the herbs. There are several varieties, but all are cultivated in the same way. The common curled-leaf type is the most readily available, but there are also moss-curled types which are very pretty.

Parsley is a biennial plant which grows to about 1 ft (30 cm). It produces small, yellowish-green flower heads in early to midsummer of the second year. If you leave it to grow for a second year, you will be able to dig up and cook the

Curled-leaf parsley is one of the prettiest and most useful plants in the herb garden.

C. Donaldson West Hugham

thin taproots, although this is not often done.

Parsley is happy growing in garden or pot. It will grow in your vegetable or herb garden in either a sunny or shady position. Almost any soil will do, as long as it is rich enough in organic matter to retain moisture. Dig in some well-rotted garden compost before sowing, if necessary. Parsley must have sufficient moisture, as it may go to seed if the roots become dry. For this reason, it thrives in well-broken-down clay loams in which the water is retained.

Sift the topsoil to make a fine, firm surface, and sow the seed thinly, any time in spring. Sow in rows ¼ in (6 mm) deep and 1 ft (30 cm) apart; then just barely cover the seed with a thin layer of peat or sand, firmed down. Water the rows using a fine rose on the watering can.

Remember that parsley seed can be very slow to germinate, so do not be discouraged if three or four weeks have passed and there is still no sign of growth. If you delay sowing until the soil is beginning to warm up in mid to late spring, there should be no difficulty in obtaining seedlings in about two weeks. Sowings made at other times may take as long as six weeks to germinate. Remember to keep the seedbed well watered at all times. If there are no seedlings after eight weeks, make another sowing.

Once the seedlings have appeared, be sure to keep the bed weeded. Aside from weeding and watering, parsley requires very little care. When the plants have produced two true leaves, you can thin them to 6 in (15 cm) apart and transplant the thinnings to 1 ft (30 cm) apart.

Spring-sown parsley will supply leaves for cutting from midsummer until the following early spring, when the plants will start to produce flower stems instead of leaves. However, if you sow another bed in midsummer, this will supply leaves for cutting from early autumn until the following midsummer, so that you will be assured of a year-round supply of fresh parsley for your kitchen. A midsummer sowing, if kept moist, should germinate in a few days, due to the increased warmth of the soil and air. Place small portable cold frames over your plants when the weather turns frosty; this will keep the plants clean and warm, and you will be able to make cuttings even in snowy weather.

Parsley is an excellent choice for growing in pots or window boxes, and you can purchase pretty terracotta or ceramic parsley pots. If you are using one

terracotta parsley pot

of these special pots, it is a good idea to sow in a seed tray and then transplant the seedlings into the pot. Sow the seed thinly in a good quality potting soil and keep the tray in a warm, damp place. Water it well, and remember that you may not see any signs of germination for quite a long time if the temperature drops. When the first two leaves have appeared, transplant to your parsley pot, and keep it in a spot which gets sun for part of the day.

A special pot is by no means essential for parsley; any deep flower pot or window box is suitable. You can sow the seed directly into an ordinary pot or window box, and thin when two true leaves have appeared. Again, with careful planning, you can expect to cut parsley all the year round.

Parsley is relatively trouble-free, although aphids or carrot flies may attack young plants. A dusting with rotenone is a good preventive measure. Young parsley seedlings may also suffer from damping-off, so be sure that the seedbed is well cared for and not overcrowded.

growing ideas

Fragrant Rosemary

Rosemary is such a pretty evergreen shrub that it is worth a place in the herb garden. Excellent with meat and poultry, it is one of the most popular cooking herbs.

A member of the *Labiatae* family, rosemary (*Rosmarinus officinalis*) is a long-lived, evergreen shrub, native to the Mediterranean regions. Under favorable conditions, rosemary may live 20 years or more, and it can reach a height of 6 ft (1.8 m), although half this size is more common. The narrow, fragrant, gray-green leaves and blue or purplish flowers make rosemary one of the prettiest plants in the herb garden, and it is often included in ornamental gardens. However, the distinctive flavor of rosemary enhances many dishes, particularly lamb and fowl. The chopped leaves, which look like pine needles, can be used for stuffings, or whole sprigs of rosemary can be roasted with meat, with superb results.

There are several different species and varieties of rosemary available as plants from herb nurseries. These are all quite similar for kitchen use, but differ in the size of the shrubs and the colors of the flowers. Decide whether you want to grow it as an individual bush or plant it

Bernard Alfieri

▲ *The fragrant leaves and mauve flowers of rosemary make it an ideal plant for a border.*

to form a continuous hedge, and consider this when you choose a variety to plant.

All rosemary thrives in a sunny, sheltered position. The best soils are light, sandy ones containing a little lime. Rosemary does not do well in water-retaining clay soil, so if clay is present in your soil it must be broken down to a more open texture by working in some sandy loam when digging.

Midspring is the best time to plant out your rosemary. Remember that it does not transplant well, so put plants in the ground where they are to grow. For hedging, space the plants about 15 in (38 cm) apart. Dig holes just large enough to take the plant and soil from the container it comes in, place the plant in the hole and firm gently with your hand. Water the young plants; established plants rarely require watering and can survive droughts which will kill off most other herbs.

Both hedges and bushes of rosemary can be clipped around early summer to keep them well-shaped and encourage new growth. If left to grow unchecked, the plants can develop a bare, woody stem with new growth appearing only at the top of the plant. Rosemary produces new shoots on one-year-old wood, and if leading shoots are not pinched back, no sideshoots will be produced. Use pruning shears to trim the bushes lightly every year just after flowering. Often the removal of shoots for culinary use is all that need be done to control growth.

harvesting sprigs of rosemary

Apart from trimmings, rosemary needs little care. In prolonged periods of drought, water should be given and weeds should not be allowed to smother it. In times of severe frost, protection is necessary.

If you already have rosemary in your garden and the plant has become unwieldy, take fresh cuttings from it in late spring or early summer, and then trim it after flowering. Allow only one year's growth to remain, and thereafter treat it as any other shrub.

You can also propagate rosemary cuttings taken from your established plants. Take cuttings from young shoots in late spring or early summer. They should be about 3 in (7.5 cm) long, either cut below a leaf joint or torn off with a heel. Set three or four cuttings in a 3 in (7.5 cm) pot filled with sandy potting soil. Water well and cover with a clear plastic bag, and keep the pots at a temperature of at least 60° F (15° C) until they root. When rooted, they are ready to be planted out into permanent positions.

You can harvest fresh sprigs of rosemary throughout the year from your established plants. Fresh sprigs have the finest, pinelike taste, but if you want to dry and store some leaves, use the shoots removed by the annual clipping. Just tie them in bunches and hang them upside down to dry in a cool, dark, airy place. When thoroughly dry, rub off the leaves and store them in an airtight container. Rosemary leaves may also be frozen.

Rosemary does well in large pots or containers filled with a good quality potting mixture. In cool temperate areas it is a good idea to have one or two pots growing in your greenhouse or on a sunny windowsill, just in case a very severe winter kills your outdoor plants. Apart from trimming and very occasional watering, pot-grown rosemary requires as little attention as outdoor-grown plants.

growing ideas

A Simple Herb for Stuffing

Sage is a favorite herb for stuffings and the hardy sage bush is very easy to grow.

This hardy, evergreen shrub grows to about 2 ft (60 cm) high and the same distance across. The stem is woody, but each year it produces a growth of soft shoots and leaves. The most common types of sage have gray-green leaves with a velvety bloom, bearing spikes of violet, blue, red or white flowers. All are very aromatic and decorative.

More unusual, and particularly decorative, are: *Icterina,* which has leaves with yellow edges; *Tricolor,* a variety with variegated leaves; and the purple-leaved *Purpurascens.* All three are less hardy than the common types.

One bush should be sufficient to supply the needs of the average family. Try one in your herb garden, in a flower border or in a tub on your patio or windowsill. As it is a slightly tender perennial, sage will not always come through prolonged cold or a really hard winter. It is a native of warm Southern Europe so choose a dry sunny spot for your plant which is sheltered from cold winds.

Sage will survive in almost any type of soil—except a very acid one. It does, however, prefer light, well-drained soil, slightly on the limy side. If you are planting in ground which has not been

Common sage is an attractive and aromatic shrub, well worth a place in your herb garden.

Brian Furner

cultivated recently, it is a good idea to add a handful of bonemeal and some well-rotted garden compost to the site a few weeks before planting.

It is quite possible to grow all sages (except the broad-leaved, non-flowering one) from seed, but this method takes a long time; plants grow slowly. If you plant seed one year you will not be able to harvest it until the next at the earliest. Sow seed in shallow drills in the spring, thin seedlings to 8–9 in (20–23 cm) apart. Expect germination in about two weeks. Finally transplant them to a permanent position in the following spring.

The most practical method is to buy a rooted cutting. These are not expensive and can be bought from garden centers and nurseries. Plant your cutting in the

staking young sage bush

prepared site giving it 2 ft (60 cm) of space all round. Put in a light, firm stake, so that it will be in the center of the bush when it grows up. When the plant gets bigger tie the main stem to this stake. The main stem is woody and brittle and, even with support, it may split under the weight of the foliage. If this should happen, lay the broken stem on the ground and cover it with soil. Be sure to keep it moist and it will have a chance to produce new roots and resume growing.

Pinch out the growing tip of the plant soon after planting, to encourage it to become bushy. Overwatering is more of a danger to sage than underwatering: overwatering can cause the roots to rot.

You can pick leaves singly at any time. They can be used fresh, or dried until they are crisp and papery, then crushed and stored in an airtight container. Tie sprigs of leaves in small bunches and hang up to dry in a warm airy place. Properly stored dried sage will keep almost indefinitely. You can also harvest a lot of leaves together in the process of pruning. New growth should be cut back to about half its length twice in midsummer or after flowering. This will stop the bush from becoming woody. Be careful that you do not cut right back to old woody branches as these may not produce new growth. Do not leave the second harvesting after the beginning of autumn as this might so weaken the bush that it will not survive the winter.

In about three or four years your sage bush will need to be replaced, so take cuttings from the bush when it is established, in readiness for this. In late spring, take off shoots about 2 in (5 cm) long with a heel of the main stem attached. Insert the cutting in moist sand, putting three to a 3½ in (9 cm) pot. Cover the cuttings with clear plastic sheeting until they have rooted. Keep them moist and warm—they need a temperature of 65°–70° F (18°–21° C) to root.

Another way to propagate is to pile soil over an old spent bush in early spring so that just the tops of the shoots are showing. Each of the branches will root and can be separated and planted out individually in early summer.

Sage, like many other herbs, can be grown indoors. Plant it in a mixture of equal parts of sand, leafmold and soil. Choose a fairly large pot to allow room for root growth and put drainage material in the pot. When the plant shows signs of being pot-bound—when its growth slows up considerably and roots begin to grow out of the drainage hole—repot it in a bigger container. Remove the plant from the old pot, loosen the roots and remove any loose soil. Repot in the same type of mixture as before, not forgetting drainage material. The best time for potting is spring.

growing ideas

Aromatic Savory

Both summer and winter savory are delicious aromatic herbs which have been popular for centuries for flavoring stuffings, stews and bean dishes.

Summer savory (*Satureia hortensis*) and winter savory (*S. montana*) are among the oldest of cultivated herbs, grown for hundreds of years for their small, powerfully scented leaves. They are members of the *Labiatae* family, which includes the sages, and the flavor is somewhat similar to that of marjoram, but stronger and somewhat peppery. Summer savory is a tender annual which grows to about 1 ft (30 cm) high, and bears pale, lavender flowers from late summer to autumn. It has a finer flavor than winter savory, a perennial sub-shrub with highly aromatic evergreen foliage which reaches a height of about 15 in (38 cm). Include both types in your herb garden; both are very easy to grow, although the cultivation for each is a bit different.

Sow seeds of summer savory outdoors from mid to late spring. Choose a site in full sun where the soil is rich and well-drained. Break up heavy clay with lighter material, such as coarse sand and humus, before sowing. Sow the seed thinly in narrow drills about 1–2 ft (30–60 cm) apart, and cover lightly with soil. Germination should take place in 10–14 days. Thin the seedlings to a final spacing of 6 in (15 cm) and water regularly until the plants are well established, after which they will tolerate quite dry conditions.

Cultivation for summer savory is a simple matter of keeping the bed weed-free, and watering during very dry weather. The leaves will be ready for harvesting about three months after sowing, just as flowering is about to begin. Summer savory is always dried before use; cut the stems with the leafy sprigs still attached, and hang them in a warm, dark, well-ventilated place until the leaves are thoroughly dry. Then rub them off the stems and store in an airtight opaque container.

Summer savory is also an excellent choice for a container herb garden. Sow the seeds in early spring in a pot or window box filled with a good quality moist potting mixture. Keep the container in a sunny place, and water the soil as it dries out. The leaves will be ready to be cut and dried in 10–12 weeks.

hanging savory up to dry

Low-growing and compact, winter savory is a good choice for a border plant. It is also useful if you plan to try a knot-garden pattern in your herb garden, as it can be clipped to shape and controlled quite easily. Do not leave it untrimmed, as it will become straggly and unkempt looking.

A well-drained, slightly sandy soil is ideal for winter savory, and the site

should have sun for at least part of the day. You can raise it from seed, following the instructions for summer savory but, as winter savory grows rather slowly, it is better to propagate it from cuttings or by root division for quick results. In late spring, you can either take heel cuttings from new sideshoots and root them in sand, or lift and divide root clumps. The plants resulting from both methods can be put in their permanent positions in late summer.

Cultivation for winter savory is also quite simple. The plants need water in dry weather, and they should be clipped in autumn, partly to keep their shape and partly so that the softer, more vulnerable parts are removed before the cold weather. In early spring it can be cut again, much harder, to encourage a closely-packed, bushy appearance. It is best to wait until the second year of growth before taking leaves for use in the kitchen. As the dried leaves of winter savory are very hard, cut only a few fresh ones for use at a time. You might also want to pot a plant in autumn to keep indoors through the winter, to make sure of a supply of fresh leaves. Plants left outdoors will cease to grow in autumn, but growth will begin again in early spring; protective covers are not usually necessary, unless the winter is severe. Winter savory is less aromatic than summer savory and has a less delicate, somewhat bitter flavor.

Both savories are free of most pests and diseases. In fact, they seem to have the ability to repel aphids, and for this reason they are often planted near such crops as broad beans, which are extremely prone to aphid attacks. The savories are attractive to bees, and a traditional remedy to relieve the pain of a bee sting is to apply a dressing of crushed savory leaves. A sprig hung in the wardrobe will repel moths; replace it with a fresh sprig when the scent fades.

R. J. Corbin

←Winter savory, a fragrant herb grown for its leaves and young shoots, prefers a sunny site and well-drained sandy soil. To maintain a closely packed, bushy appearance, cut it back hard in early spring, and again, lightly, in autumn.

growing ideas

Try Tasty Tarragon

Try the unusual and slightly anise-flavored leaves of this hardy, perennial herb to add a new taste to chicken and egg dishes, or for a tangy vinegar.

Tarragon (*Artemisia dracunculus*) is a member of the *Compositae* family, which includes a wide variety of plants ranging from lettuce to dandelions. And like most members of this family, tarragon is easy to grow, provided it has well-drained soil. The name tarragon comes from a French word meaning "little dragon," and is thought to have been given either because it described the strong, biting taste of the leaves, or perhaps because the herb was considered to have special, magical powers to cure bites from poisonous reptiles.

There are two types of tarragon, French and Russian. French tarragon is an attractive and aromatic low-growing, somewhat shrubby perennial, reaching about 3 ft (90 cm) high and the same size across. It has dark green, shiny leaves which are narrow and pointed. When flowers are produced, they are in tiny clusters and greenish-white. French tarragon is the type with the finer flavor. Russian tarragon is a larger plant, with less slender leaves, but its aroma and flavor are inferior to the French type.

Being a native of southern Europe, tarragon prefers a site which receives sun for most of the day, and one which is sheltered from cold winds. Good drainage is essential, as persistent winter damp will cause root rot, and the plant may quickly die. On the other hand, it does need moisture during the growing period, so add rotted organic matter before planting, to act as a sponge.

True French tarragon does not produce fertile seed in cool climates; it is propagated by root division or cuttings. You can also buy young plants to put out either in late spring or in early autumn. Dig a hole slightly larger than the pot the plant is growing in, remove the plant from the pot carefully, and put the plant in the ground. Fill in the soil around it and firm well with your hands.

Tarragon requires little care, except for weeding, and occasional watering if the weather is very hot and dry. Protect the plants in all but the most mild winters, and always protect tarragon which has been planted out in autumn, as frost can kill the young plants before they are established. Tarragon is free of virtually all pests and diseases.

Over the years tarragon leaves will begin to lose flavor. Either replace the plants every four or five years, or divide them and transplant to a new location so that the soil does not become impoverished. You might want to keep two plants growing which have been planted in different years, so that you can replace one at a time and keep up a good supply of leaves.

Fresh leaves from established plants can be taken any time during the growing season. Cut sprigs as you need them from early spring until midautumn. If you want to dry tarragon, take shoots in early to midsummer, or just before the plant begins to flower. Tie them in bunches and hang them in a dark, airy place to dry, such as an attic, spare room or airy cupboard, then store in airtight opaque jars. However, do not expect as strong a flavor from dried leaves as from

George Hyde

▲ *Well-grown sprigs of delicately flavored French tarragon ready for cutting.*

fresh. Tarragon is one herb which can be successfully frozen, and sprigs of fresh leaves can also be kept in sterilized glass jars.

Tarragon is not a particularly good subject for pot or window box cultivation. However, you can lift the plants in autumn and keep them during the winter in a cool greenhouse or a frame, where they should provide fresh leaves throughout the year. Keep the soil only just moist, and do not let the plants get warmer than 55° F (13° C); otherwise the shoots are forced to grow fast, get very soft, and die as soon as the temperature drops. Plant them out again in spring.

If you want to propagate tarragon, do it by root division from your mature plants, preferably in late spring. Any small piece of root with a shoot on it will grow. You can also try propagating from cuttings of new shoots in spring or summer. Cuttings should be off the shoot tips, about 4 in (10 cm) long; put them in a good potting mix, with clear polyethylene over them, and leave in a warm shaded position. They will be ready for planting out four or five weeks later, when well-rooted.

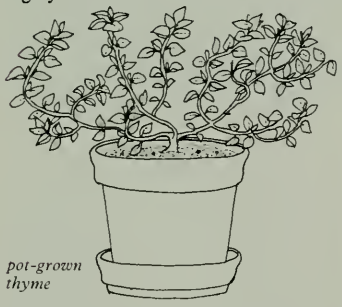
French tarragon has a variety of uses in the kitchen. Use the leaves, either fresh or dried, with chicken, in egg dishes, to flavor hollandaise sauce or mayonnaise, or put a sprig in a bottle of white wine vinegar.

growing ideas

Give Pride of Place to This Popular Herb

Thyme is one of the most popular herbs for cooking. Take your pick from several different types and add this lovely plant to your herb garden or window sill.

There are a number of different varieties of thyme—all of them perennial—but the most widely grown are common thyme and lemon thyme. Both are low-growing, reasonably hardy, evergreen plants, which are well worth including in the herb garden. Their dense habit of growth also makes them suitable for the rock garden, or for use as ground cover. A further possibility is to grow creeping thyme between paving stones; the herb is highly aromatic and, when crushed or trodden on, its perfume is intensified. It also makes a good container plant. Properly cared for and in suitable conditions, thyme will flourish for many years.



pot-grown thyme

Common thyme reaches a height of 4–8 in (10–20 cm), with a 1 ft (30 cm) spread. It has small, dark green leaves, and clusters of tiny mauve flowers, which appear from mid- to late summer. Common thyme is an essential ingredient of mixed herbs or "bouquet garni." Its pungent flavor perfectly complements rich meat and fish dishes and is excellent in poultry stuffing.

Lemon thyme reaches a height of 12 in (30 cm) and forms a looser bush than common thyme. It has broader, lemon-scented leaves, and produces deep pink flowers in late summer. It is slightly less hardy than common thyme. Its uses are similar to those of the latter but, because of its lemony quality, it not only complements meat and fish but it is also suitable as a flavoring for desserts and summer drinks.

Thyme grows best in a sunny, sheltered spot. The ideal soil is a limy one, which is light and well-drained. Sandy soils may be used for growing thyme, but clay soil is unsuitable. If your soil is at all heavy, improve its drainage by incorporating organic matter, such as peat. Do not add too much organic matter, however, since this will lead to sappy growth and plants that are unable to withstand the cold of winter.

There are several ways to propagate thyme; from cuttings, by root division or layering, or from seed. Alternatively, you can simply buy young plants from a nursery. Once thyme is established, it frequently propagates itself without assistance.

If you decide to grow thyme from cuttings, you should take cuttings of the tips of young shoots, about 2 in (5 cm) long, from established plants in early summer. Insert the cuttings into a mixture of equal parts of peat and sand in a pot and

➤*The small, mauve flowers of common thyme make it a lovely plant for herb garden, rockery or border. The leaves can be cut and used for flavoring both before and during the flowering period.*

Grant Heilman

➤*The variegated leaves of Silver Posy (below left) make it one of the most decorative of the ornamental thymes. The foliage of lemon thyme (below right) has a delicate citrus fragrance and flavor.*

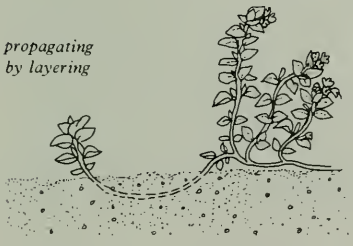
Bernard Alfieri

Harry Smith

cover with a transparent, blown-up plastic bag. When they have produced roots, move each rooted cutting to a 3 in (7.5 cm) pot of a loose friable potting soil, and then transfer the young plants to their final growing positions, about 1–1½ ft (30–45 cm) apart, in early autumn.

If you prefer to propagate thyme by root division, you should do this in mid to late spring when the weather is getting warmer. Choose mature plants and carefully lift them; then divide them by gentle tearing into separate clumps, each with a good portion of root, and replant them in their new positions. Growing thyme in this way will produce quicker results than if you use cuttings: plants propagated by root division will make plenty of leaf growth in their first season, while plants grown from cuttings will not do so until the following spring.

Another rapid and reliable way of increasing thyme is by layering, and this



propagating by layering

should be carried out at the same time as root division. Spread the main stems out from the center, flatten them down and cover them with soil, so that 3–4 in (7.5–10 cm) of the leafy tips are showing. The stems will produce roots, and the rooted sections can then be detached and replanted in summer or early autumn.

Common thyme can be propagated from seed, although the other methods previously described are more reliable. Sow the seed in trays of moist seed mixture in late spring. The seed is tiny, so sow it thinly and give it the barest covering of fine soil mix. Maintain a warm temperature—60° F (16° C) is ideal—until germination occurs. When the seedlings are large enough to handle, transplant them to larger trays or singly to 2 in (5 cm) pots. Once the plants are growing strongly, you can move them on to their final outdoor positions at the normal spacing of 1 ft (30 cm), but remember to harden them off first if the weather is at all chilly.

In an average summer, established plants will need little extra watering other than that supplied naturally by rainfall. Since the plants are so low-growing, keep them free of weeds so that they are not choked. In winter, lemon thyme will need protection from frost, and so will common thyme if the winter is severe. Protect the plants with straw or, if they are growing in pots, bring them indoors for the winter. After about three or four years, you should replace existing plants with new ones, or they will become thin and straggly. Fortunately, thyme is virtually free of pests and diseases, but keep a lookout for aphids, which occasionally cause trouble, and spray with pyrethrum.

Fresh thyme may be harvested throughout the summer. Pick sprigs of the herb when the weather is dry, and continue harvesting as required until the plant flowers. For winter use, when the

harvesting thyme

plant is not making new growth, you could dry some leaves—these keep their flavor well. Cut off a few sprigs, take the leaves and place these in a dark, warm, dry and airy spot. When the leaves have dried completely, after a few days, rub them off the stems and store them in an airtight container.

growing ideas

Beefeaters' Delight

Horseradish has a pungent, peppery flavor and the distinctive tang of horseradish sauce is a favorite accompaniment to beef.

Horseradish sauce is a favorite with cold meat, as is a tangy horseradish-flavored butter to pour over fish. The marvelous pungent taste can only be fully enjoyed if the horseradish is grated fresh just before use. Horseradish is not a difficult crop to grow, so why not save a small spot in your garden and grow some of these delicious roots?

In cultivation since ancient times, horseradish probably originated in southeastern Europe or western Asia. It is used in cooking by many cultures, and it is traditionally used as one of the bitter herbs eaten during the Jewish Passover festival.

The horseradish plant (*Armoracia rusticana*) is a member of the *Cruciferae* family, which includes the brassicas. A perennial herb, it bears large, glossy, spoon-shaped leaves, but unlike most other members of the family, it is almost never cultivated for the leaves, which are coarse and unpleasant in taste. Instead, it is grown for its thin, tapering, fleshy, whitish roots, which can reach up to 2 ft (60 cm) in length. The foliage reaches a height of about 2 ft (60 cm) and the plant produces small white flowers in summer on stems about 4 ft (1.2 m) tall.

A hardy perennial, horseradish will grow just about anywhere and after dying down in autumn, it will sprout again in spring and will take over more ground each season if left to itself. However, if the plant is allowed to run rampant, the roots will be elongated and wispy, so it pays to take a bit of care with the crop.

Ground preparation is the major work

Bernard Alfieri

Plant horseradish roots in a prepared trench in early spring. Space the roots 1½ ft (45 cm) apart and 4–6 in (10–15 cm) deep. The crop takes a year to mature and will be ready for harvesting in the following spring.

Brian Furner

Fresh horseradish can be lifted throughout the summer, then lifted for storing in autumn.

in growing horseradish. Thorough preparation is essential to achieve a rich soil of good depth where the roots will thrive. Keep in mind that it pays to be quite generous with horseradish, as other crops will also benefit when they are moved into the site as part of your rotation plan. However, horseradish can spread fast and be very difficult to eradicate without great care, and it may be better in the long run to grow it in isolated corners where its spread will not cause too much trouble.

Choose a small section of well-drained ground which gets full sun for at least part of the day. A rich soil is essential, and if your garden is not on deep, rich loam, you must add plenty of well-rotted manure, garden compost or leafmold.

The usual method of growing horseradish is to prepare square trenches in early spring. Each plant needs 1 sq yd (1 sq m) dug to a depth of 2 ft (60 cm). Prepare the trenches in early spring, when roots for planting should be available from your nursery or garden center. To make the trenches, remove the topsoil and mix well-rotted manure or compost with the soil in the lower part of the trench at the rate of 11–15 lb per sq yd (5–7 kg per sq m). Then return the topsoil to the trench.

Brian Furner

The small, white flowers of the horseradish plant can be seen in summer. After flowering, the plant will die down in autumn and sprout again in the following spring.

You are then ready to plant the roots. Plant them 1½ ft (45 cm) apart and 4–6 in (10–15 cm) deep in the trench, and cover with soil. Roots planted in early spring will be ready for harvesting by the following spring.

The horseradish bed requires only a minimum of care. Hoe to remove weeds in the early stages, and water in dry weather. If any of the outer leaves turn brown, remove them. The crop does not require winter protection, even in the coldest of years.

When the leaves are growing strongly in the spring of the year after planting, you are ready to begin digging the roots. Those roots near the surface should be harvested first. The vegetable is most flavorful when freshly dug; dig up what you require at one time and grate it immediately for the most pungent taste and aroma. The essential flavor disappears quickly if the plant is allowed to dry out.

You can leave horseradish in the ground for digging as required through the summer. Then in autumn you can lift the remaining roots and store them in dry sand, keeping them in a cool, dark place, to be used through the winter as needed. This is a good idea if you want to use the rich bed for another crop. In any case, you should lift the plants completely in the autumn of the second year after planting, or the bed will get out of control. Clear the ground completely of all pieces of root, or the plant will be a great nuisance. Divide the crop, keeping the thicker roots for the kitchen, and the small, thin ones (about pencil thickness) to replant in a new bed in autumn or the following late winter. Store them until required.

Use your horseradish in hot or cold sauces, in flavored butters for fish dishes, to add a peppery tang to vinegars, or freshly grated for a pungent taste in salads.

You can also dry horseradish and store the grated roots in a jar, but the flavor will not be as strong.

Kale

Brassica oleracea acephala (fam. *Cruciferae*)
Hardy perennial grown as an annual
Sowing to harvesting time: 8–10 weeks
Size: up to 18 in (45 cm) across; height from 1 ft (30 cm) for dwarf varieties to more for tall varieties
Yield: 1–2¼ lb (0.5–1.0 kg) per plant

Kale, or borecole as it is sometimes called, is an underrated vegetable and one which deserves more attention from the amateur grower. As a winter vegetable, it makes an excellent alternative to cabbage when cooked and served in the same way. Kale is one of the hardiest vegetables and will produce tender sideshoots when few other greens are available in the garden.

Kale grows well in most types of soil and will tolerate poorer conditions and lower temperatures than some other members of the cabbage family, making it a popular crop in northern regions. Kale has some resistance to club root disease, which can severely harm other members of the cabbage family. It is a relatively labor-free crop, although proper preparation and cultivation will give increased yields. Scotch, or curly kale, is probably the most popular variety for home growing.

Types of kale

There are several different divisions into which varieties of kale can be classified; some are better for culinary use than others. The Scotch kales are probably the hardiest variety and are widely grown in Scotland, as the name implies. They are non-hearting and have curly leaves which look like giant parsley. Scotch kale is grown for the young leaves and shoots; all kales are harvested beginning with the top shoots and young leaves, and then the remainder down the stem. The height of kale varies from about 9 in (23 cm) for dwarf strains to 2½–3 ft (75–90 cm) for taller strains.

The tall-growing, perennial kales are hardy, vigorous and bushy. The leaves are less curly than Scotch kale, and less tasty. Most kale varieties cultivated in the United States are grown from seed, but perennial kale may be propagated by cuttings.

Plain-leaved kales are smooth-leaved, very hardy, and tend to be rather coarse in texture. They are best eaten when very young.

Rape kales—grown chiefly in Europe—are smaller but produce large crops in spring and summer. The edible shoots are similar to asparagus. Rape kales are usually compact and about 20

▲ *Curly kale is hardy and an excellent source of winter and early spring greens.*

in (50 cm) high. The succulent shoots, which arise from the leaf joints, are picked when young and tender.

Ornamental kales are popular in private gardens for their variously colored decorative leaves. These are visually attractive and are sometimes grown in herbaceous borders. They are also used for garnishing, exhibition work and on their own as vegetables.

Tree kales can grow to a height of 10 ft (3 m) or more. The thousand-headed kale is one of the smallest tree kales, but it produces few sideshoots and is only eaten when other greens are scarce. The Jersey kale or tree cabbage can reach 12 ft (3.6 m) in height. It is grown mainly in a group of British islands in the English Channel.

Suitable site and soil

Kale is a very accommodating plant, and will make itself at home in most parts of a garden. Because kales are also sown in mid to late summer for winter cropping, remember to set aside an area for this crop so that ground preparations can proceed in good time.

Kale prefers an open sunny site to a shady one, and one with a bit of shelter. Taller varieties may be blown over on exposed sites, and growth may be severely checked by cold north and east winds unless the plants are protected. Avoid low-lying land or frost pockets.

Kale thrives best in rich loams but will tolerate most soils, including those which are moderately acid or neutral. Try to correct very acid soils with applications of lime because acidity encourages club root disease. The soil must be well drained; if the kale roots come into contact with standing water in the winter, root rot will set in.

Ground that was well manured for a previous crop should be used for planting kale, provided it does not follow brassicas or crops of the cabbage and mustard family. As part of crop rotation, it can follow broad beans, peas or let-

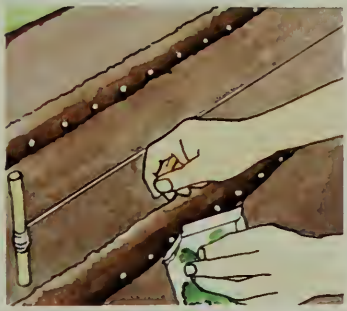
SOIL PREPARATION AND SOWING

1. Dig the ground at least 1 ft (30 cm) deep well before sowing.

2. Dig in well-rotted manure, one barrow-load per 11 sq yd (9 sq m).

3. After digging and manuring, lightly fork in complete fertilizer.

4. Just before sowing, make shallow drills ½ in (1.3 cm) deep.



5. Sow the seeds thinly, from midspring onward.

6. After sowing, cover the seeds with soil and rake over the bed.

Harry Smith

Ornamental kale is available in many colors and is good for kitchen or exhibition.

tuce; in this way there will be less chance of severe outbreaks of pests and diseases. Kale is sometimes interplanted between rows of potatoes, if there is a shortage of space, but to do this it is necessary to plan a wide spacing between your rows of potatoes.

Soil preparation

Kale will produce satisfactory crops from minimal preparation, but will amply repay careful attention to its needs. It is a gross feeder, benefiting from deep cultivation and generous manuring. When kale is not following a previously well-manured crop, dig in garden compost, farmyard manure, or similar material at the rate of one barrowload to 12 sq yd (10 sq m). Dig the ground 1 ft (30 cm) deep, burying the organic matter as work proceeds. Remove and destroy any weeds, particularly perennial ones such as bindweed, couch grass and thistles. Soil preparation should be done well in advance to allow the ground to settle before sowing or planting. If necessary, lime the soil to raise the pH to 6.5–6.8. Do this before giving a dressing of fertilizer.

The nutritional needs of kale are similar to those of cabbage. If it has to face harsh winter weather avoid fertilizers with too much nitrogen which leads to soft growth. Apply a compound fertilizer containing 5 percent nitrogen, 5 percent phosphate and 10 percent potash at the rate of 2½ oz per sq yd (75 g per sq m) and lightly fork it in.

THINNING AND TRANSPLANTING

1. For direct-sown seeds, thin to a final distance of 18–24 in (45–60 cm). Extra seedlings can be transplanted.

2. Thin plants raised in a seedbed when large enough to handle. This is best done in showery weather.

3. Water the plants thoroughly 24 hours before lifting. Keep a ball of soil around roots when transplanting and, in warm weather, fill holes with water before inserting seedlings.

4. All cabbage-type plants must be firmly planted. After transplanting, firm the soil around the plant.

5. Test for firmness by pulling a leaf gently; if the kale is loose or comes up, replant as instructed above.

A-Z Collection

A well-grown crop of curly kale which will be ready for harvesting the following winter.

If you are preparing a seedbed and plan to transplant the kale seedlings to another final position, lime the seedbed and then dress it with superphosphate at the rate of 1 oz per sq yd (30 g per sq m).

Seed sowing

Early spring is the best time to sow kale for early cropping. In mild districts sowing can take place from late spring up until late summer for crops in winter and early spring. The actual date depends on the variety of kale, when you want to crop it, and local weather conditions; ideally you should get the crop well established before the cold winter sets in.

Sowing time is the same for both direct sowings and seeds sown in a seedbed for later transplanting. Even for other types, it is not a good idea to leave seedlings in the nursery seedbed longer than necessary, so make sure there will be space in the garden ready for the young transplanted kale.

Buy seeds which have been treated with a combination of insecticide and fungicide. One packet can produce several hundred plants. Make the drills ½ in (1.3 cm) deep with a draw hoe; if the weather is dry, water the drills. Then sow the seeds thinly in the furrows, and draw the soil over them, firming them as you go. The spacing of the seed rows varies according to the methods and varieties used, but 4–6 in (10–15 cm) between rows in the seedbed is the usual distance, and 18–24 in (45–60 cm) in the case of the direct-sown crop. For protection against flea beetle, dust the surface of the seed drill after sowing with pyrethrum, rotenone or Sevin and again when the seedlings emerge. You may need bird scaring devices as the seedlings are particularly attractive to pigeons. Keep the weeds under control, and thin the direct-sown crop to final distances of 18–24 in (45–60 cm) apart. You can use the surplus seedlings for transplanting.

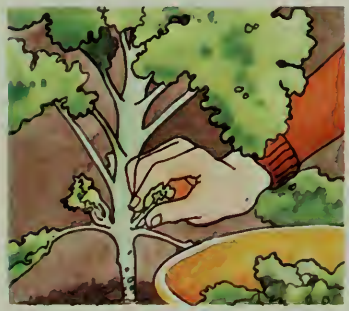
CULTIVATION AND HARVESTING

1. Dust plants with insecticide to guard against flea beetle.

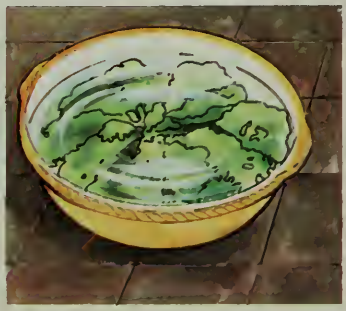
2. If the weather is dry, water the soil around the plants.

3. In autumn, earth-up around the plants with a draw hoe.

4. Harvest the loose crowns first, whenever ready.



5. Without crowns, sideshoots will develop; pick these like broccoli.



6. Store kale by immersing whole heads in frequently changed water.

Transplanting seedlings
Young plants grown in a seedbed are thinned when large enough to handle. It is best to do this in showery weather; if the soil is dry, lightly water the plants first. Thin again as necessary to ensure that the young plants are never crowded.

Plant the young kale in its final position when four to five leaves have formed; for early spring-sown kale this is usually in late spring. Water the plants thoroughly 24 hours before lifting. If possible, do the planting out in dull showery weather. Lift them carefully, with a good rootball of soil and plant them in the prepared holes, spaced 18–24 in (45–60 cm) apart in both directions. Set the plants slightly deeper in the ground than they were in the seedbed, using a trowel rather than a dibber.

Cultivation
For both direct-sown and transplanted kale, cultivation needs are quite modest. Water in dry weather, keep down weeds, and watch for signs of pests or disease, applying chemical control if necessary. Earth-up around the plants in autumn as far as the basal leaves. This practice gives extra support to the stems during winter gales and protects them from frost.

You can, to encourage further growth, give a light feeding in late winter, where weather permits, to improve the spring harvest.

Harvesting
Leave the harvesting of kale until all other greens in the garden have been used. Although you could begin picking kale in autumn, it is not really tasty until it has been frosted. Start cropping then and make the plants last until midspring.

Except for the tree and hearting kales, which are grown for their leaves, the edible parts are the short sideshoots which are produced along the stalks. Most varieties have loose crowns, rather than compact hearts like cabbage. Cut these first, to stimulate side growths. Pick the sideshoots from the top, working downward. Continue picking until the plant is stripped or it runs to seed. Eat the shoots and leaves when they are young; otherwise they tend to be tough and bitter.

When the season is over, place leaves and leaf stalks on the compost heap unless they are diseased. Lift and burn the hard woody roots, as they are not suitable for composting.

Exhibition tips
Kale is not often shown by amateurs in exhibits, although many exhibitions mounted by seed companies display varieties of kale. Ornamental kales with colored foliage are probably the best variety to raise for show work, as they can also be used for flower arranging. The judges will look for young, well-developed heads; three is the usual number.

Freezing tips
As with other leafy green vegetables, a bumper crop of kale can be preserved in your freezer. Remove any tough stems from healthy, young leaves; wash leaves well and heat in boiling water for two minutes. Cool the kale immediately in cold water, drain and pack it into containers—leaving ½ in (1.3 cm) head space for expansion.

Varieties

Blue Curled Scotch: 70 days. Grows 12 in (30 cm) tall, twice as wide. Stands well; holds color. Good in South.

Dwarf Blue Curled Vates: 55 days. Low, compact; good all winter to Massachusetts along the coast, less inland.

Dwarf Green Curled Scotch: 55 days. Low and wide; white-ribbed leaves yellow-green. Can be used like lettuce when young.

Dwarf Siberian: 65 days. Hardy, spreading; plumelike leaves slightly frilled at edges. Stands cold very well.

Tall Green Curled Scotch: Much like the Dwarf but taller, more spreading; holds leaves well off ground.

Other varieties

Ornamental Kale: crimped, very frilled leaves, green with purple, rose and white shadings; colorings become more pronounced in cold weather.

Pentland Brig: hybrid between plain leaf kale and curled kale; very hardy, producing heavy crops of leafy shoots; flower heads can be used as sprouting broccoli.

Extra-curled Scotch: dark green, handsome curled leaves; very hardy kale, heavy cropper.

Perennial Kale: hardy variety raised from cuttings; not easy to obtain stock.

Thousand-headed: hardiest of all plain-leaved kales, useful in severe winters; very productive but not particularly tasty; eat when young.

Hungry Gap: very useful dwarf rape kale variety; hardy and prolific, combination of leafing and sprouting types; can be cropped until early summer; very good flavor.

Asparagus: curled leaves, asparaguslike shoots in axils which can be cut through spring; hardy and prolific rape kale; one of best later varieties.

Drumhead: hearting type with curled, wavy leaves.

Brian Furner

▲ *Dwarf Green Curled*

Pat Brindley

▲ *Pentland Brig, popular abroad.*

Pat Brindley

◀*Perennial Kale, an English variety.*

Pests & Diseases

Good drainage, weed control, cleaning up of debris and destruction of infected plants help avoid garden problems.

Club root: although kale is not so vulnerable to club root as other members of the cabbage family, it is occasionally attacked by this fungus. Symptoms of club root are bluish and wilting leaves, and swollen, black, rotting roots which have an unpleasant odor. It is most likely to occur on acid, badly-drained soils, so make sure any drainage problem and excessive acidity are corrected before planting. Using a recommended and locally approved fungicide, treat the seed drills before sowing.

Downy mildew: this fungus disease appears as whitish patches, usually on the undersides of the leaves, which then turn yellow and wilt. Approved sprays will help. Spray infected plants.

Black ring spot: this virus causes black spots or rings to form on the outer leaves, usually on the younger and lower leaves. There is no known control; practice good cultivation and remove and destroy any infected plants.

Blackleg: this causes disease similar to damping-off in young seedlings; infected plants will turn black and collapse at ground level. If the seedlings do not die, they will never completely recover and will remain stunted. Dust seeds and seedbeds with an approved fungicide.

Wireworm: the larvae of the click beetle are most damaging in weedy, neglected gardens and on newly cultivated soils which were previously grassland. It is unlikely you will have trouble with them on a well-established vegetable plot as long as it is properly cultivated and weeds are kept down. The larvae, which are long, shiny and brown, live in the soil and eat the roots of plants, severely damaging or killing them.

The best precaution against wireworm is to make sure your ground is cultivated well and often. Hoe between plants to keep weeds down, and also to expose wireworms to birds. Seeds treated with insecticide are somewhat less vulnerable.

Cabbage maggot: the legless maggots of cabbage root fly chew off all the side roots, until only the taproot is left. They then tunnel into the stems. Symptoms of root fly are leaves turning gray and collapsing and swollen roots enclosing white maggots. If the plants are not killed outright, they give poor yields. Remove and burn any infested plants, as well as the soil immediately around the roots. Attacks can be much reduced by treating the soil with diazinon granules when sowing.

Cutworms: these night-feeding brown or gray caterpillars bite young stems off, severing the kale at or slightly below ground level. Control them by spreading a cutworm bait around the stems of the plants.

Flea beetle: the presence of numerous small round holes in seed leaves, or complete defoliation of seedlings are the main symptoms of flea beetle. They are most active in mid- and late spring when the weather is fine. Dust the seedlings with pyrethrum, rotenone or Sevin.

Whitefly: these resemble little white moths and feed on the undersides of the leaves. Besides damaging the plants by sucking the sap, they exude honeydew which encourages sooty mold. Spray with malathion as soon as you see them.

Slugs and snails: leaves and stems partially eaten and covered with slime trails are evidence of slugs and snails. Cutworm baits are a good remedy.

Cabbage butterfly: the green caterpillar form of this insect feeds on the leaf tissues of kale, causing widespread damage. Cabbage butterfly caterpillars eat the outer leaves until they are skeleton-

ized, and foul the plants with excrement. Check the leaves for yellow eggs, and crush any you find between your fingers. Pick off the colonies of caterpillars as you see them, and dust or spray the infested plants with rotenone or Sevin.

Aphids: these insects form colonies on the undersides of the leaves, which then become curled, blistered or discolored. A good preventive measure is to dig up and burn all stumps of cabbages or sprouts left in the ground after harvesting is finished. Rotenone, Sevin or pyrethrum can control aphids to some extent.

Murphy Chemical Co.

These dead, wilting leaves are the result of wireworm attack on the roots.

Murphy Chemical Co.

Maggots of cabbage root fly chew off side roots of kale, and tunnel up the main stem.

Aphids form colonies on the tips or leaves of kale and suck out the juices.

GUIDE TO KALE TROUBLES

Symptom	*Probable cause*
Bluish, wilting leaves, swollen, black, rotting roots	Club root
White patches on undersides of leaves	Downy mildew
Black spots or rings on leaves	Ring spot
Seedlings collapsing at ground level, stunted plants	Blackleg
Leaves turn gray and collapse; roots swollen with white maggots	Cabbage maggot
Stems severed at or slightly below ground level	Cutworms
Small round holes in seed leaves, or complete defoliation	Flea beetle
Undersides of leaves damaged, honeydew on leaves	Whitefly
Leaves skeletonized, covered with excrement	Cabbage butterflies
Leaves curled, blistered, discolored	Aphids
Leaves and stems partially eaten; slime trails	Slugs and snails
Plants wilt and die; roots tunneled	Wireworms

growing ideas

Try This "Quick Off the Mark" Vegetable

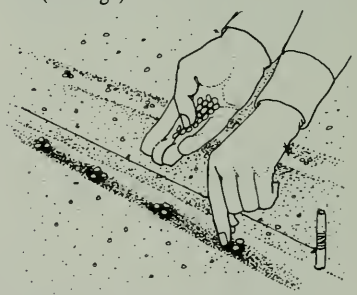
Kohlrabi is a hardy, quick-maturing vegetable with a delicious nutty flavor.

The edible part of kohlrabi resembles a turnip, but it is in fact the swollen stem, not the root. The plants grow to a height of 8–12 in (20–30 cm), and two varieties are available: the White Vienna, which is grown for summer use, and in fact has pale green stems, and the Purple Vienna, producing pale purple stems, slightly coarser than those of the summer type. Both forms are attractive enough for ornamental use in the garden, and so you can grow them among your flowers if space is limited.

There are several advantages to growing kohlrabi. It is an extremely tolerant plant and, although it produces best results when grown in the cool weather of spring or autumn, it can withstand both droughts and considerable frost. It does not tend to run to seed. Being fairly quick to mature, 8–11 weeks from sowing, it can be used for catch cropping and intercropping.

The important thing to remember when growing kohlrabi is that quick, unchecked growth produces the most succulent stems. The vegetable will grow in most soils, but a rich, fertile loam will give faster growth, and so a more successful crop. Choose a sunny site, preferably where the ground was manured for the previous year's crop; otherwise, dig in well-rotted compost or manure well before sowing, ideally the fall before. This will not only enrich the soil, but will help to lighten heavy soil, least suitable for kohlrabi.

Also, check the soil for acidity with a pH test: kohlrabi needs a pH of at least 6.5–6.8. If club root is likely to be a trouble bring the pH up nearer neutral. Correct any acidity by adding lime to the soil. Avoid growing kohlrabi on freshly manured soil, and never grow it where other plants have shown signs of club root disease. Bear in mind that for the purposes of rotation, kohlrabi is a brassica (cabbage).



sowing kohlrabi seeds in drills

If you do not have a garden, kohlrabi is a suitable crop for container-growing. Try it in pots, tubs or boxes, allowing an area of 5–6 sq in (12.5–15 sq cm) for every plant.

For summer harvesting, sow kohlrabi

seeds from early spring to early summer. If you want a crop sooner than usual, however, you can sow the seeds four to six weeks before the first date in frames, hotbeds or greenhouses. Move the seedlings into boxes, and then transplant the young plants outdoors after hardening off. For an autumn crop, sow the seed from mid- to late summer.

It is best not to sow all the seed at the same time, but to make successional sowings every three or four weeks. This will insure a steady supply of the vegetable, and it will also mean that plants will be ready for harvesting at different times. This is important since if there are too many mature plants at one time, you will not be able to pick them all, and those left in the ground will run the risk of becoming too large and tough to be edible.

You can sow the seed in a seedbed, and then transplant the seedlings later, or you can sow directly into the final site. Sow the seed thinly about ½ in (1.3 cm) deep in drills; leave 15–18 in (38–45 cm) between drills. As soon as the seedlings are large enough to handle, they should be thinned. Thin them to a spacing of 10 in (25 cm).

Pat Brindley

▲ *The pale green swollen stems of "white" kohlrabi after harvesting.*

thinning to the strongest seedling

Any seedlings removed from the ground when thinning may be transplanted to form other rows, and this will delay their growth—yet another way to make sure that different plants mature at different times. When transplanting, take care not to place the seedlings too deeply in the soil, or the stems may swell below the surface. Always water well after thinning and transplanting. An alternative course is to initially thin the seedlings to only 6 in (15 cm) apart, and then, when the stems have swollen to a diameter of 2 in (5 cm), start harvesting by picking alternate plants. The remaining plants will then be left to grow larger at a distance of 1 ft (30 cm).

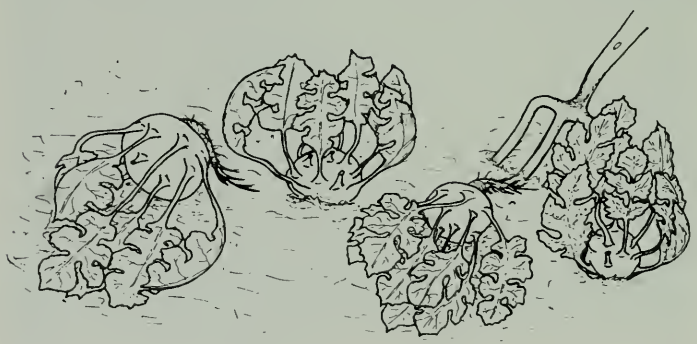
During growth, care of the plants is very simple: keep them well-watered and free of weeds so that there is no check to growth. It is a good idea to hoe around the plants frequently. Not only will this suppress any weeds, but it will also loosen the soil. When hoeing, always pull the soil away from the plants rather than toward them.

The pests most likely to attack kohlrabi are flea beetles, but cabbage flies and caterpillars may also be a problem. Caterpillars may be removed by hand-picking, or you can spray or dust the plants with pyrethrum, rotenone or Sevin to control most pests.

Club root may be troublesome, especially if the plants are grown in acid soil. Treating the soil with lime to correct any acidity will help to prevent the disease. As an additional precaution, you can also dust the drill with a locally approved control.

Kohlrabi should be harvested when moderate-sized globes have formed: 3 in (7.5 cm) is the maximum diameter you should allow, but 2 in (5 cm) is ideal. Stems which swell to sizes any larger than these are edible but a good deal of outer flesh has to be removed, and eventually when much bigger they will develop hard skins, woody interiors and poor flavor, making them impossible to use.

As long as the globes are not growing too large, you can leave them in the



lifting the largest stems first; smaller ones can then develop further.

Bernard Alfieri

▲ *Also a useful autumn vegetable, purple kohlrabi is an unusually attractive plant.*

ground until you need them; after the middle of autumn they will not get any larger even when left in the soil. You can also pick them and store them in peat but, as kohlrabi shrivels more quickly than stored root vegetables, you will not be able to keep them in this way for any great length of time. If you do decide to store the globes, start by filling a box with a 2 in (5 cm) layer of dry peat; lay the vegetables on top so that they do not touch each other, and then scatter on more peat to come level with the tops of the globes; finish by adding another 2 in (5 cm) peat layer. Continue in this way until the box is full.

A better alternative to storing in peat, however, is to deep-freeze the vegetables. It is best to harvest them young and blanch them whole.

There are various ways to use kohlrabi. When you have picked the vegetables, cut off the tops and the roots, and cut off the leaves—do not pull them off. If the globes are young, all you need do to prepare them is to scrub the skins. With older specimens, you should remove the tough, outer rinds. The globes can be fried or boiled and eaten hot, or cooked and eaten cold in salads. They can also be grated like carrots and eaten raw.

Kohlrabi leaves may also be eaten, cooked like cabbage, and the thinnings added to salads. Consign any unused parts of the plants to the compost heap.

step-by-step growing guide

Leeks

Allium ampeloprasum porrum (fam. *Alliaceae*)
Hardy biennial, grown as an **annual**
Sowing to harvesting time: 16–20 weeks
Size: leaves up to 1 ft (30 cm) long; bulbs 3–6 in (7.5–15 cm) long and up to 4½ in (11.3 cm) in diameter ("pot" varieties), 6–12 in (15–30 cm) long and 2 in (5 cm) in diameter (long varieties)
Yield: 10–12 plants per 10 ft (3 m) row

One of the finest vegetables, the leek is easy to grow, useful, and very versatile. The blanched, elongated bulb at the base of the leaves makes a tasty fresh vegetable, either on its own or in stews and casseroles. The rich green leaf tops are excellent for flavoring soups. Besides being tasty, leeks are also nutritious; they are rich in vitamin A.

A member of the onion family, leeks are much easier than onions to grow. They are very tolerant of soil conditions, growing in any soil which is not waterlogged, and, unlike onions, they are generally free from pests and diseases. Most varieties are perfectly hardy and can remain in the ground through winter weather in milder areas until needed. You can, by sowing early under glass, have leeks for harvesting in late summer and autumn, but it is really during winter and early spring that they are most welcome. Other garden vegetables are scarce at this time, and those in the stores are expensive.

There are long and short (or medium length) varieties of leeks available; the short ("pot") leeks are very popular in the north of England and Scotland, where they are often grown for exhibition work. Pot leeks are thick and stumpy, rather than tall, and have circumferences of up to 15 in (38 cm).

Of the long leeks, broad flag varieties are less frost-hardy, and in colder climates, are often lifted before heavy winter weather sets in.

Suitable site and soil

Although leeks are tolerant of a wide range of soil types, they grow best on a moist, light soil that has been heavily manured for a previous crop. Freshly manured soil is not suitable, because leeks grown in very rich soil will be tough and coarse, with too much leaf growth. If the soil is in need of organic matter, it is best to dig in well-rotted garden compost, leafmold or peat just before planting. If the soil is deficient in

SOWING AND THINNING

1. If the soil is deficient in potash, apply a potash-rich fertilizer to the soil before sowing in spring.

2. Sow seeds thinly, about 100 seeds to the yard (meter), in shallow drills; cover the seeds with fine sifted soil.

3. Thin the young leeks in two stages, to a final distance of 4 in (10 cm) apart; use thinnings for salads.

potash, apply a fertilizer rich in potash (the fertilizers used for tomatoes are suitable).

In crop rotation, leeks follow lettuce, cabbage or peas, but it is not a good idea to plant them immediately after lifting early potatoes though this is often done in mild areas. This is because the soil will be too loose and disturbed, and leeks do best on a firm soil.

Apart from other considerations, the choice of situation in the vegetable plot may be influenced by the fact that leeks are often left in the ground to be dug up as required in fall or spring. If you use a strict rotation system, you should bear this in mind, unless you have reserved a plot for semi-permanent crops like asparagus or artichokes, and there is some free space for your leeks. Do not grow leeks in the same place year after year or there will be an increased risk of pests and diseases.

Sowing

Sowing in February or March in the North under glass is necessary if you want leeks ready for summer and autumn exhibition, but for normal household consumption it is possible to wait until early spring, depending on weather, when they can be sown outdoors. They can either be sown in a seedbed for transplanting the following summer, or sown in their permanent positions. If sown in a seedbed, you have the additional bother of transplanting. Against this must be balanced the fact that if they are sown in their permanent position, they will take up a lot of space for a very long time before producing results.

Sow the seeds thinly—about 100 seeds to the yard (meter)—as germination is usually very good, in drills about ¼ in (6 mm) deep, and cover the seeds with fine sifted soil. If properly stored, the seeds will remain viable for four years so you can keep extra seeds for future use. After covering the seeds, firm the drills down and water if the soil is dry. Drills should be 2½ ft (75 cm) apart in the permanent bed. Germination should take 14–21

TRANSPLANTING

1. Transplant leeks in early to midsummer, when they are about 8 in (20 cm) high; do this in showery weather if possible.

2. Cut back the roots until they are 1 in (2.5 cm) long; trim the leaf tips back slightly.

3. Use a thick dibber or trowel to form holes; make the holes vertical and about 2 in (5 cm) in diameter.

4. Lower the young leeks into the hole and fill with water; the water will wash soil over the base of the plant, to keep it in position.

days, and thinning should begin as soon as possible, when the plants are not more than thin green shoots, about six weeks from sowing. Thin moderately the first time, as some of the plants may die, and then thin again, when all seems to be going well, so that the plants are about 4–6 in (10–15 cm) apart.

Planting out

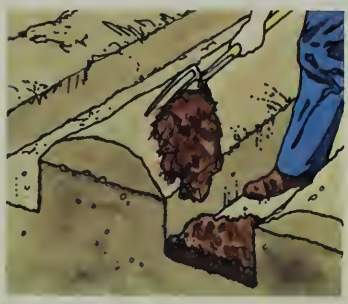
By midsummer, when they are about as thick as pencils and 8 in (20 cm) high, the leeks will be ready for transplanting to the permanent bed. If you can plant during showery weather, the young leeks will get over their planting check much more quickly; otherwise you can water the seedbed the day before lifting if the soil is dry.

There are several methods of planting out leeks, depending partly on soil type and partly on the quality sought. Exhibition leeks are usually grown on the flat, because it suits the special methods used for blanching and is least likely to damage the roots. Unlike those grown for kitchen use, leeks grown for exhibition should never have their roots or leaves cut back when transplanted. You can also grow leeks in shallow trenches, pot holes, or, if the soil is heavy and badly drained, on raised beds.

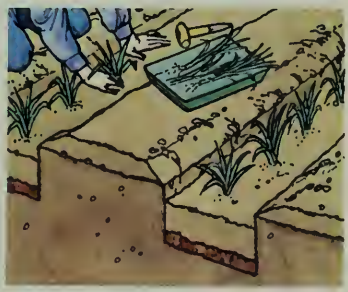
To plant leeks in holes, use a thick dibber or trowel; make the holes 6 in (15 cm) deep, and 6–9 in (15–23 cm) apart, depending on what size of leeks you plan to harvest. Many people prefer the taste of the smaller, tender, immature leeks to that of the enormous, prize-winning ones. Make sure the holes are vertical, and move the dibber about from side to side so that they are slightly larger at the top; the holes should be about 2 in (5 cm) in diameter. Cut back the roots until they are 1 in (2.5 cm) long, and trim the tips of the leaves back slightly. Lower the young leeks into the holes, and gently fill the holes with water. The water will wash enough soil over the base of the plant for it to become established. As you hoe the rows from time to time, the holes will gradually fill up with soil. Leeks grown in this way will not be completely blanched, but the pale green portions seem to impart the best flavor to a soup. If you prefer thoroughly blanched leeks, this can be done quite easily by earthing-up. A useful tip to note when planting is that by the time the leeks have reached transplanting size, it will be possible to see which way the leaves arch. They can then be planted so that the leaves of each plant run along the row, instead of at right angles to it, taking up more space, and being liable to injury during cultivation.

Another way of growing leeks is to plant them 6–10 in (15–25 cm) apart in a trench. This method is particularly good if you have a deep, fertile soil; otherwise it is best to plant on the flat. The trench should be excavated to a depth of 1 ft (30 cm) and if there is more than one trench, they should be at least 2½ ft (75 cm) apart. If you try to dig the trenches closer together, the walls of the trench are likely to collapse. Into the bottom of each trench dig about 3 in (7.5 cm) of well-rotted garden compost and cover it with about 6 in (15 cm) of topsoil. Carefully plant the leeks, perfectly upright, in the bottom of the trench. Then water in as before. Form the remaining soil into flat-topped ridges between the rows. These ridges are excellent places for

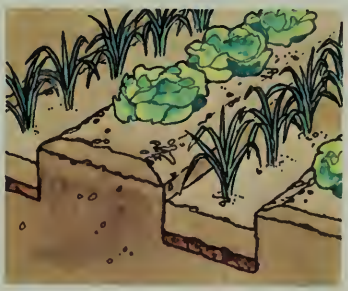
GROWING LEEKS IN TRENCHES



1. Dig trenches 1 ft (30 cm) deep and 2½ ft (75 cm) apart; fork 3 in (7.5 cm) of garden compost into the bottom.



2. Cover compost with 6 in (15 cm) of topsoil, and carefully plant leeks 6–10 in (15–25 cm) apart; water thoroughly.



3. Grow quick catch crops, such as radishes or lettuce, on ridges before soil is needed for earthing-up.

quick catch crops, such as lettuce or radishes, which will be harvested well before the soil is needed for earthing-up the growing leeks.

Cultivation and care

Water the young plants generously until they are well established. Soon after planting apply liquid manure. If the soil is not adequately rich in fertilizers, nitrate of soda or sulfate of ammonia may be applied at the rate of ⅓ oz per yard of row (10 g per meter of row) about five weeks after planting and watered in; or apply liquid food about once every two weeks through the growing season, instead of giving the single dressing of dry fertilizer.

Hoe between the rows regularly to keep down weeds and also to aerate the soil. Frequent hoeing also creates a dust mulch which, some feel, helps conserve moisture. Leaves which grow too long and unmanageable can be cut back slightly so that they do not trail on the ground. Cut the long, dark green, outer leaves back by about 2 in (5 cm) in early summer, again in midsummer, and a third time if necessary, in early autumn. If you are growing leeks for exhibition, however, do not shorten the leaves unless they are decayed.

BLANCHING

1. To keep stems free of soil, place collars around stems up to the base of the leaves.

2. Then draw up soil from between rows, using a draw hoe; repeat as necessary, fitting another collar above the first one if desired.

3. You can start blanching with paper collars; support paper collars with bamboo canes.

4. As the leeks grow, replace paper collars with 4 x 12 in (10 x 30 cm) clay drainpipes.

Blanching

Blanching leeks increases the proportion of plant which is edible, and improves the flavor, which would otherwise be strong and fairly harsh. Begin blanching as soon as the plants are large enough; it is a gradual process and should be done in several stages rather than all at once. There are several methods of blanching, depending on the way in which the leeks are growing.

If your leeks are growing in a trench, blanching consists of gradually filling the trench with soil to the bottom of the lowest leaves each time, until the plants have ceased to grow, which will probably be sometime in autumn, depending on the weather. This should give you 4–6 in (10–15 cm) of blanched stem at least. One word of advice, however: the soil used for earthing-up must be dry, friable and very fine textured. If it is wet when earthed-up, rot is liable to set in. If the soil is lumpy, it will be difficult to handle and will not exclude light properly.

If grown on the flat, push the soil up around the plants, increasing the soil depth by about 2 in (5 cm) each time. You can keep the stems free of soil by using collars, which are secured around the leeks up to the base of the leaves. Various materials can be used for the collar: lengths sawn from plastic piping, clay drain pipes, or, at virtually no cost, pieces of strong brown paper secured with string or rubber bands. If you use paper tubes, support them with bamboo canes. Whatever form of collar you use, the minimum diameter should be 3 in (7.5 cm); they should be 12–15 in (30–38 cm) long.

Attach the collars before earthing-up. As the plants grow. draw up more and more soil with a hoe, fitting another collar above the first one if needed.

Although it is not strictly necessary, you can put planks of wood, on edge, along both sides of the row instead of using collars. This forms a sort of box into which the soil is put, until the desired height of soil is reached. With this system, you can use silver sand, leafmold or peat instead of soil.

Marshall Cavendish/Jerry Tubby

▲ *Leeks are very hardy, and can remain in the ground through winter in many areas.*

Harvesting and aftercare

Leeks may be harvested almost any time—first as green onions, then through fall to late spring, depending on time of sowing, variety and mildness of climate. The hardier varieties are left where they grow until needed. Never pull leeks out of the ground by brute force, or they will more than likely break in two, leaving you with a handful of leaves. Instead, lever them out of the ground with a spade or fork. Take the largest first; the smallest, if left until the spring, will put on some weight before running to flower. If the ground is likely to be frozen for long periods of time, it is a good idea to mulch heavily to keep the ground unfrozen or to lift any leeks which are ready and store them in sand in a cool place, where they will keep for about a month. If toward the end of the season you have a few leeks still in the ground but need the plot cleared for new planting, you can dig the leeks up and heel them in a shaded place, until needed. Lay them on their sides in a shallow trench with the top part of the leaf stalk

projecting above the ground, covering the rest of the stalk with soil. This also helps to stop them from bolting.

You can, by leaving leeks in the ground and nipping out the flower stems, get a bonus crop: leek bulbs. These small white bulbs will form at the base of the plant; harvest them in early summer and use as onions or shallots.

If you grow prize-winning leeks and want to keep a particular strain for future show work, allow one or two leeks to flower. Tiny, complete plants, or "pods," will form among the seeds on the seed pod; these can be detached and potted and grown in the greenhouse.

Exhibition tips

Leek-growing competitions, in which enormous size was the determining factor, have long been a tradition in the north of England and Scotland. In the United States, however, where we do not have these competitions, well-grown leeks can be an asset to any display.

For midsummer exhibits, seeds should be sown in early to midwinter. Remember that with exhibition leeks, it is quality rather than quantity that is called for. Six is a common number shown for single dishes, and nine leeks for collections, so do not get caught up in raising unnecessarily large numbers of leeks. Sow the seeds thinly in a good seed mixture so the tiny seedlings do not have to compete for food, air and moisture.

For germination to be successful, temperature should be kept at 55° F (13° C). After germination it can be reduced a little, gradually; remember that leeks are hardy and although they are required to be well-grown for early planting out, too much warmth will force them and make them leggy. When the seedlings are about 2 in (5 cm) high, transplant them into pans filled with a good potting soil. The seedlings should be 3 in (7.5 cm) apart in all directions. Be very careful not to damage the tiny single root which supplies nourishment to the plant until additional roots have formed. The young leeks will probably need potting again before planting out, into 5 or 6 in (12.5–15 cm) pots. If small pots are full of roots some weeks before planting out time, then bigger pots will be essential. In early spring, put the trays in cold frames, to harden the young plants before planting out in the spring.

Lifting the leeks prior to exhibition is a fairly delicate operation; it is all too easy to wreck a season's work by damaging the leeks at this time. Remember that as many roots as possible should remain intact on the plant.

Before actually digging them up, it is a wise precaution to gently tie the top foliage upright with soft twine. Well-

HEELING IN

1. Dig a narrow trench in a cool place; lay leeks on their sides with leaf stalks projecting above ground.

2. Cover leeks with soil and firm down with feet; heeling in helps to stop leeks from bolting.

R. J. Corbin

▲ *Well-blanched specimens of Musselburgh, a good variety for exhibition and culinary use.*

grown leeks tend to have brittle top foliage, and it will snap off if mishandled.

After tying the foliage, scrape away all sand, soil or peat from the base of the plant. Lift off any drainpipes; occasionally you may have to carefully break the drainpipe with a hammer to get the leek out. If they have been grown in cardboard tubes, it is best to leave the tubes on until the leeks have been lifted. The tubes are then cut open, carefully, with a sharp knife.

Lift the specimens with a fork, digging well under the roots so you do not inadvertently spear the leek. Once the leeks are out of the ground, wrap them in clean, damp cloths or paper; if you leave them exposed to the light, the blanched portions will rapidly turn green. Take them indoors and carefully cut away the first outer layer of soiled leaves. You may have to remove a second layer of leaves, but do not remove more than necessary, or the leeks' appearance will be damaged.

After removing the outer leaves, totally immerse the leeks in cold water, to get rid of all traces of soil. Change the water several times, until the leeks are perfectly clean. They should be cleaned while still tied, or the leaves may snap off in the water.

Leeks must be packed carefully for transport to the show; this is particularly important because their large size makes handling difficult. While in transit the leeks should be kept cool, otherwise the foliage may turn yellow.

Depending on the number shown, leeks are displayed flat on the benches, in a basket, or vertically. One way to display them vertically is to make a round wooden base, about 1 in (2.5 cm) thick, through which you hammer the required number of spikes. These spikes, usually bright metal nails, should be equidistant from each other, and protrude about 2 in (5 cm) above the board. Just before the show, place the board right side up on the bench, cover the

W. Robinson & Sons

Well-grown pot leeks: these thick, stumpy leeks are very popular for exhibition. Leeks can be more than 1 ft (30 cm) in circumference, and are judged by their cubic size. Leeks for show must not be bulbous at the root end, but should by cylindrical in shape, and free from coarseness.

surface with a thick bed of parsley, and fix the leeks securely onto the nails. Because the leeks may tend to lean at slightly different angles, it is best to tie the tips of the leeks together with soft green twine. Three or four bands of twine should be enough to secure them firmly. When this is done, remove the twine which tied the individual leaves together, from the lifting stage onward. If well done, the leeks will look like white columns, seemingly unsupported.

The judges will look for solid, thick leeks, not less than 1 ft (30 cm) long, without any tapering, swelling at the base, or discoloration. The leeks should be as uniform as possible.

With the right preparation, leeks can be one of the more rewarding crops in your garden. When leeks are of poor quality, it is usually because the seeds were not sown early enough and planting was in soil unable to provide enough moisture in dry periods. Correct preparation of your garden soil and the planting of leek seedlings in their permanent site as early in summer as possible will promote healthy plants that will give you less trouble than most vegetables. Remember, too, that the plants need space in which to achieve their best growth. If the seedlings are too clustered together, they must be thinned; overcrowding will discourage healthy development.

Pests & Diseases

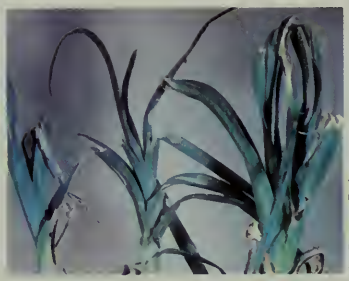
Leeks are relatively pest- and disease-free, as long as they are part of a crop rotation plan and are not grown on the same ground several years running. Pesticides may be necessary nonetheless.

Onion fly: Leeks are occasionally attacked by this pest, which is troublesome in the larval stage, when the maggots tunnel into the plant tissue. The fly, which looks like a small gray housefly, lays its eggs in spring and early summer, near the base of the leek, on the leaves and in the soil nearby. Scattering diazinon granules in late spring will help to control the emerging larva. Like onions, young leeks seem particularly vulnerable. Lift and destroy any infested leeks; the main symptoms are yellowing and drooping foliage.

When lifting the infested leeks, make sure there are no maggots left lying on the ground. Because the flies are attracted to the smell of fresh manure, make sure leeks are not planted on freshly manured ground.

Leek moth: this small brown moth is a problem in European leek cultivation. It lays its eggs on the base of leek plants during mid and late spring. The emerging pale green caterpillars tunnel through the leaves, which are disfigured with white streaks. As more and more tunnels are made, the leeks lose their strength and may collapse and die.

White rot: this fungal infection attacks onions, shallots and garlic as well as leeks, and is most noticeable in hot, dry summers. Plants grown in overcrowded conditions are particularly vulnerable. Infected leeks will have yellow leaves, with a white or gray fungus covering the underground base of the plant, looking like strands of white thread. The spores can remain viable in the soil for years, so proper crop rotation is the best precau-



Dr. Peterson Becker

▲ *Tattered, brown leek leaves caused by caterpillars of the leek moth.*

Dr. Peterson Becker

▲ *Pupae of the leek moth, a pest in gardens abroad; the moths emerge in midsummer.*

GUIDE TO LEEK TROUBLES

Symptoms	*Probable cause*
Yellow, drooping foliage, tunnels in plant tissue	Onion fly
White streaks on leaves	Leek moth
Yellow leaves, white or gray fungus at base of plant	White rot
Leaf tips die back, white papery patches on leaves	White tip
Orange, powdery spots on older leaves	Leek rust

Royal Horticultural Society, Wisley, Surrey

▲ *These orange, powdery spots indicate leek rust; infected leaves will turn yellow.*

Sutton Seeds Ltd

▲ *Musselburgh*

tion against white rot. Leeks grown on fertile, organically manured soil seem less vulnerable.

White tip: this is fungal infection that attacks leek plants abroad. It usually appears from late summer through the winter. Symptoms are a white dieback of the leaf tips, white patches appearing on other parts of the leaf and stem, and stunted growth. Infected leaves look watery, thin and papery; eventually they rot away. Besides looking unpleasant, infected leeks wilt quickly and will not keep at all. Badly infected leeks should be removed and destroyed, and the remainder sprayed every two weeks with a fungicide until all white patches disappear.

Leek rust: this fungal infection is more prevalent when the autumn and winter are unusually mild. Leeks growing in soil which is rich in nitrogen but lacks potassium are particularly vulnerable. The symptoms of leek rust are orange, powdery spots on older leaves, which later turn yellow. Although they are disfigured, leeks with mild rust infections can still be eaten. Badly infected plants should be dug up and destroyed. To control the spread of the disease, spray the remainder of the leeks with zineb.

Varieties

American Flag (Broad London): perhaps the best-known variety in the United States; mild, sweet, long-stemmed.
Elephant: medium early, large; for late summer, fall, winter storage in North.
Giant Musselburgh: a popular variety; thick-stemmed—to 3 in (7.5 cm)—white, tender.
North Pole: late, heavy cropper, vigorous; winter hardy in many areas.
Titan: extra long, early; for summer crop.

Brian Furner

▲ *Elephant*

Brian Furner

▲ *American Flag*

Brian Furner

▲ *Unique*

Lyon Prizetaker: new in United States (popular abroad); long-stemmed, good flavor.
Unique: very long, moderately thick; cold hardy, stores well.

Other varieties
Winter Crop: extra hardy variety, dark green foliage with large white stems; long lasting, keeps until midspring without loss of foliage.
Malabar: quick growing variety for autumn use; stem medium length, with dark green tops.

Giant Winter (Royal Favorite): very large, pure white stems, leaves very dark; longest lasting, can be pulled in mid to late spring.
Marble Pillar: early variety, suitable for pulling from autumn through midspring; produces good, solid, very long white stems.
Northumberland: short, thick, early leek, to be pulled in autumn; original "pot" leek of certain British miners.
Catalina: a variety with long, thick, fleshy stems, mild flavor; very long standing, and can be left in the ground.

Brian Furner

▲ *Lyon Prizetaker*

Brian Furner

▲ *North Pole*

Lettuce

Lactuca sativa (fam. *Compositae*)
Half-hardy annual
Sowing to harvesting time: 6–13 weeks
Size: Head and loose-leaf types between 6–15 in (15–38 cm) in diameter; cos (romaine) types between 8–16 in (20–40 cm) tall
Yield: 9–12 heads, each weighing about 8–12 oz (224–340 g), per 10 ft (3 m) row

The most popular salad vegetable, lettuce is easily grown and, with careful planning, you can have a long season of yield. Tender young lettuce, freshly cut, has an unbeatable flavor and the crop is a must for every kitchen garden.

There are three main types of lettuce: head varieties, which are hearted and look like cabbages, taller and crisper romaine (cos) types, and the frizzy-headed loose-leaf (American) lettuces. Head lettuce can be further divided into butterheads, with tender butter-colored hearts, and crispheads, which are crisper and have hearts that blanch to white. The hearts of romaine lettuce are also blanched—many varieties of romaine are self-blanching with leaves which fold in by themselves. Leaf varieties are harvested by picking single leaves, rather than by cutting the whole plant.

Lettuce has been much hybridized since the early sixties, and there are all sorts of varieties now available for growing at particular periods of the year. There are also several new dwarf lettuces available for the small garden or for container growing. Before buying your lettuce seed, study the catalogs carefully. Most catalogs specify which varieties are suitable for which season. When growing out of season, in particular, it is important to choose varieties which have been bred specially for that particular purpose, such as early spring cropping or heated greenhouse winter cropping.

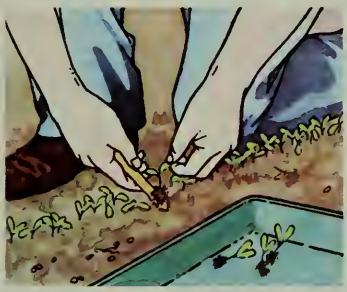
Preparing the soil

Lettuce will grow well on almost any garden soil, although preferring soil that is rich and light, well-drained and dug. Clays which are well broken down produce very good plants, as will sandy or gravelly soils which have been bulked with organic matter. The site should have its humus content renewed every year with an application of farmyard manure, rich compost or green manure worked into the ground at a rate of 13 lb per sq yd (6 kg per sq m) the autumn before a spring sowing. This will also aid in water retention, which is important because lettuce is 90 percent water and must have very moist soil to grow rap-

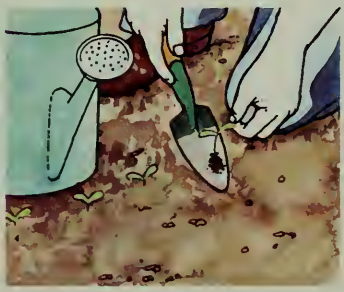
CULTIVATION

1. Lettuce likes a neutral soil, so prepare the ground prior to sowing with an application of lime.

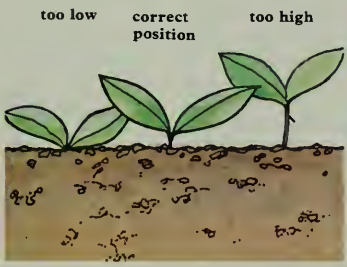
2. For early spring sowings outdoors, prepare shallow drills and sow the seed very thinly.



3. Thin when two leaves have formed. If thinnings are to be transplanted, handle gently by one leaf only.



4. Prepare the holes before transplanting, put the seedlings in and water the ground well.



5. Take care to transplant the seedlings with the neck exactly level with the soil; planting too low may cause gray mold.

6. Seedlings can be put into the ground which has been covered with sheets of plastic to retain moisture.

GROWING PLAN FOR

	RECOMMENDED VARIETIES	GROWING CONDITIONS
SUMMER LETTUCE	Hot Weather or Great Lakes	Sow outdoors at 3-week intervals for a long harvesting period
	All the Year Round	Has one of the longest periods for cutting. Sow outdoors in spring or in frames in autumn
	Valmaine	Good summer cos type to grow outdoors
	Salad bowl or Oakleaf	Sow outdoors. Pick by pulling outer leaves
AUTUMN LETTUCE	Dark Green Boston	Good autumn sort for general use
	Buttercrunch	Quick-maturing butterhead which can withstand a hot summer
WINTER LETTUCE	Deci-Minor	Must be forced in a heated greenhouse
	Stokes Evergreen	Good for growing under glass outside in mild climates
	Black-seeded Simpson	For growing in a cold frame or greenhouse, outdoors where mild
SPRING LETTUCE	All the Year Round	Sow in frames, where possible, outdoors if mild
	Grand Rapids Forcing	Prefers a heated greenhouse, but can be successful in frames in mild areas

Bernard Alfieri

KEY

sow

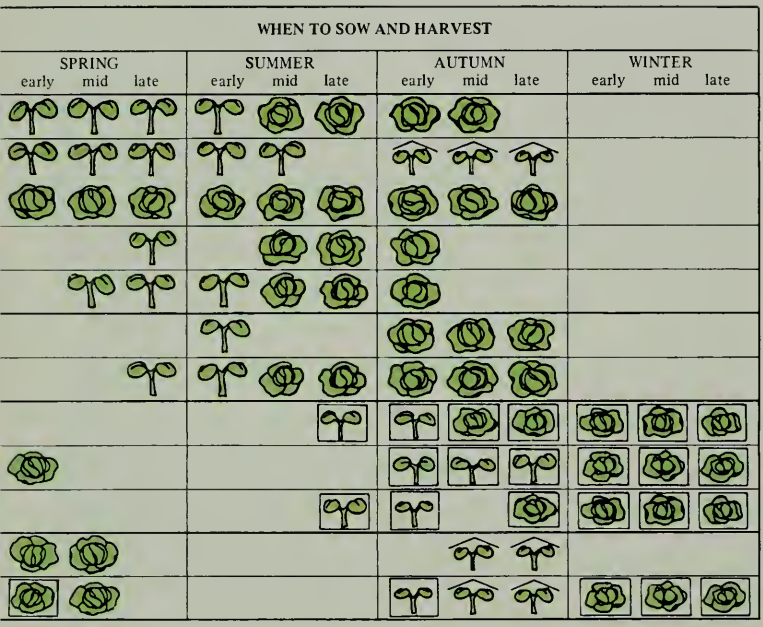
harvest

for greenhouse growing

for growing in frames

Summer lettuce grown from successional sowings. The ones in the center are ready for cutting.

YEAR-ROUND LETTUCE



idly and form well. Lettuce also needs lime (a pH of 6.0–7.0 is best), so test soil and apply lime before sowing if necessary. Poor and ill-prepared soil will produce floppy leaves. It will also cause failure to heart-up.

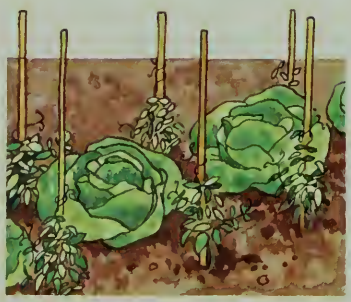
Quick-growing lettuce is a good vegetable for intercropping between rows of other vegetables, such as tall varieties of peas, providing you have prepared the soil carefully.

Planning your sowings

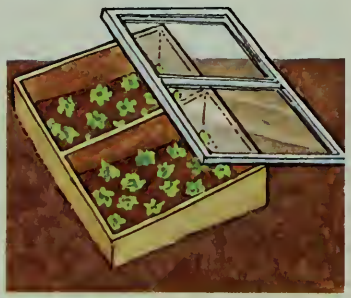
Lettuce can be available for harvesting most of the year if you make successional sowings of different varieties. Classification is by the season for harvesting, not the time of sowing, so choose your varieties, whether head, cos or loose-leaf types, according to your harvesting needs.

Summer lettuce: sowing outdoors can start in early spring with the first of a succession of sowings at two-week intervals designed to maintain a supply of lettuce from early summer until the autumn. Choose head, cos or loose-leaf varieties; plant a mixture to give a varied crop. Sowing several different kinds also gives varied rates of germination and development, and extends the period for cutting. (Cos is best in hot weather.)

Unfortunately, a routine of successful sowings does not guarantee an uninterrupted supply of prime lettuce. Except in a steadily favorable climate, there are times when the lettuce growth is checked. And when the weather is hot, the whole crop engages in a race to see which plant can bolt (run to seed prematurely) first. Bolting used to be a serious problem to lettuce growers, but newer



To catch crop, sow lettuce between rows of peas, preferably running north to south to avoid shading.



Lettuce is ideal for growing in cold frames: sow the seed in late winter for harvesting in spring.

Extend the period of harvesting by successional sowings. Plant some lettuce every two weeks in spring.

For late winter and spring crops sow hardy varieties in autumn and protect with plastic tunnels.

varieties are less likely to bolt in high temperatures, if kept well-watered.

Sow the seed fairly thinly in short shallow drills about ½ in (1.3 cm) deep and 1 ft (30 cm) apart. The seed should germinate in about 4–12 days, and you should thin as soon as the first pair of true leaves have formed. Aim for a spacing of one plant every 9–12 in (23–30 cm) depending on the size of the variety.

It is best to sow lettuce where the plants are to remain, as transplanting can cause a check in growth. In any case, transplanting is satisfactory only very early in the growing season, as later transplants are more liable to bolt. When transplanting lettuce, lever the plants gently out of the ground with a spatula and handle only the leaves with your finger and thumb. Lower the transplants into prepared holes, then firm them down and water them well to be sure that the rootlets will make good contact with the soil. Do not plant too high or the lettuce will not heart; too low planting can cause gray mold infections of the lower leaves. The neck of the plant must be exactly at soil level.

You can give transplanted lettuce a better start by putting the plants in a row covered by a strip of black plastic. Secure the edges of the plastic by weighting down with stones, then make cross-shaped cuts about 12 in (30 cm) apart,

Harry Smith

▲ *Butterhead lettuce grown under protective covers and ready for cutting.*

and transplant the lettuce. The plastic will help retain moisture in the soil.

Autumn lettuce: choose head or cos types for autumn lettuce. Sow the seed as you would for summer lettuce, in succession from midsummer to late summer. Sow where the plants are to mature. Thin the 2–3 in (5–7.5 cm) high seedlings so that you have about 9–12 in (23–30 cm) between plants. Your first sowings should be ready for cutting by early autumn; the last by late autumn, if protected. However, the latest sowings may be slow to grow and may not be ready without covering. If you protect these plants with frames or tunnels they should withstand fall frosts and will certainly be ready for cutting before severe weather arrives.

Winter lettuce: if you have a heated greenhouse, you can enjoy fresh lettuce from early winter to early spring. A well-constructed and well-designed greenhouse where you can maintain a temperature of 60° F (15° C) is a necessity. However, you should keep in mind the amount of fuel needed to maintain this temperature, and consider that in a cold winter it could prove very expensive to grow your own lettuce.

If you decide to grow winter lettuce, make successive sowings in early to midautumn of a head variety. Sow in seed trays that are filled with good quality soil mix. Germination must take place at temperatures between 50–60° F (10–15° C). Move the 2 in (5 cm) high seedlings into boxes and plant them in

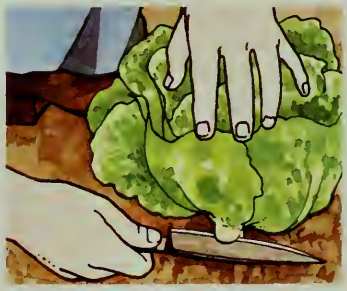
7. Weed between the young plants with a draw hoe. In addition to keeping down the weeds, this will help to discourage any egg-laying insects from settling in.

8. Lettuce needs a great deal of water to grow well. Keep the soil very moist; a trickle hose is ideal because water seeps out slowly, providing moisture without overwatering.

9. Mulch the young lettuce by applying well-rotted garden compost with a fork. This will keep down the weeds and retain moisture.

10. Slugs love sweet, tender young lettuce plants. Discourage these pests by scattering slug pellets on the ground between the rows. Also, clear away decaying plant material.

11. To test for firmness, apply gentle pressure to the heart with the back of your hand.



12. To harvest head or cos lettuce, use a sharp knife to cut just below the lowest leaves.

cropping position, 9–12 in (23–30 cm) apart, as soon as the first pair of true leaves is fully developed. The greenhouse temperature should be kept at 60° F (15° C) for three weeks after planting, and thereafter maintained at 50–55° F (10–13° C). Maintaining humidity in the greenhouse (through controlled watering and ventilation) is also important, as the lettuce needs a moist environment.

Spring lettuce: spring lettuce can be grown outdoors or under protection. Sowing outdoors is satisfactory only in areas where the winters are fairly mild, and even then you must choose hardy types. The crop will not survive on cold, heavy ground, so choose an open, sunny site with land well manured for a previous crop. Sow the seed in a seedbed in late summer, and plant out between mid and late autumn in rows 1 ft (30 cm) apart, allowing 9 in (23 cm) between plants. Hoe the rows just before winter sets in; then leave them alone until growth restarts in early spring, when they will need the same care as spring-planted types.

Spring lettuce is generally more successful if protected over the winter. Follow the basic instructions above, but protect the rows with glass frames. Thin seedlings to about 9 in (23 cm) apart in early winter. When growth begins again in early spring, remove the covering gradually. Cutting for the plants uncovered first should begin in midspring.

Care and cultivation

All lettuce varieties require warmth, moisture and a weed-free environment with protection from garden pests. The soil must be well prepared so that it is rich enough in humus to retain moisture adequately. Give the lettuce as much water as the roots require, but do not try to hurry growth by overwatering. It may be difficult in hot weather to keep soil moist and prevent a crust from forming; overcome this by mulching with well-rotted organic matter. Strips of black plastic placed on the ground close to the

13. If you are growing a variety of cos which is not self-blanching, blanch by tying around the middle and then around the top a week later.

14. Loose-leaf lettuce is picked by pulling the outer leaves. Pull them off gently and take them into the kitchen. The plant will go on producing new leaves for some time.

15. To store, pull up the whole plant and tie a plastic bag around the roots. Keep in refrigerator.

plants will also help to retain moisture, especially if placed down just after rain.

Hoe frequently between the rows and the plants. This will kill the weeds before their roots are big enough to compete with the crop.

If you are growing one of the varieties of romaine lettuce which is not self-blanching, you may want to blanch the plants to increase their crispness. About two weeks before the lettuce is ready for harvesting, apply a tie of raffia or a rubber band around the thickest part of the plant. One week later, make another tie about 6 in (15 cm) further up. The harvested lettuce will be firm and crisp.

Cutting your lettuce

Harvest lettuce as soon as it is at its best and fully hearted. When the heart begins to form a point and push upward, the plant is beginning to bolt and the quality will fall off rapidly. The lettuce should feel firm, so test for firmness by pressing with the back of your hand, not with your fingers which will bruise the plants.

Cut lettuce with a sharp knife, just above the lowest leaves, or pull out by the roots and cut them off. If the lettuce is going to be stored, it is best to pull the whole plant, enclose the roots in a plastic bag and chill. The lettuce will keep fresh for about a week. Disease-free roots can be put on the compost heap.

If you are growing loose-leaf lettuce, harvest it as you would spinach by pulling off individual leaves from the outside of the plant when they are firm, but still young and tender. The plant will continue to produce new leaves for quite a long time.

Growing in containers

If you do not have a heated greenhouse, you can grow lettuce in containers indoors for winter supplies of fresh salad. Lettuce is a good vegetable to grow in containers as there are several dwarf varieties available. Head lettuce which requires a lot of space is unsuitable, so choose from the smaller varieties available or plant cos or the loose-leaf American types. Tom Thumb lettuce, a head type specially bred for small gardens or containers, needs only 6 in (15 cm) when mature and will grow well in 8 in (20 cm) plant pots.

Loose-leaf lettuce is ideal for growing in individual pots on a sunny windowsill. Pick leaves as required.

Sow the seeds in containers, tubs, or individual pots filled with a good quality soil mix. Sow about 3 in (7.5 cm) apart and cover with a fine layer of the mix or with the soil mixed with peat. If you have the space for several containers, make successional sowings to extend the period of cutting. Thin the 2 in (5 cm) high seedlings to a distance of 6 in (15 cm) apart for loose-leaf varieties and 8 in (20 cm) apart for cos types. If you use individual pots, sow about 3 seeds to each one, and then thin to the strongest seedling.

Keep your containers in a warm sunny position, and remember that all lettuce needs a great deal of water and the soil must never be allowed to dry out.

Cut your lettuce as soon as the plants have hearted, or pull off mature leaves from loose-leaf types. When one plant is cut, you can replant new seed in the same pot and have a succession of crops.

Lettuce cannot be stored for long periods in a storage cellar, nor can it be canned or frozen for preservation. But growing it in one or more pots on a sunny windowsill will provide a steady supply of greens for your table all winter.

Varieties

There are dozens of varieties of lettuce available to the home grower, a vast selection of different types for sowing at different seasons. Consider what type of lettuce you prefer, and plan your succession of sowings according to season. Some seed merchants offer lettuce variety packs containing seeds of several types to be sown throughout the year. We have divided our list of selected varieties into head, cos and loose-leaf American types, and we have indicated the best time for sowing, as well as suitability for container- or greenhouse-growing.

Brian Furnet

▲ *Webb's Wonderful*

Iris Hardwick Library

▲ *Great Lakes and Tom Thumb*▼

Brian Furnet

Head lettuce (*summer/autumn varieties*)

All the Year Round: butterhead, good for sowing throughout the year, where possible, but best for autumn or spring sowing; crisp and well-flavored.

Bibb: small, crisp heads ideal for individual salads; outer leaves dark, inner blanch to yellow; slow to bolt or tip burn.

Buttercrunch: like Bibb but larger, more spreading; heads compact, heavy for size with leaves thick, juicy, crisp; more heat-resistant and slower to bolt.

Butter King: an All-America winner; a crisp, delicious butterhead; slow to bolt, even in South; disease-resistant.

Dark Green Boston: a standard and old favorite in Northeast; medium size, smooth and tender; ideal for spring planting and fall cropping; retains freshness.

Great Lakes: high-quality crisphead which makes large, solid hearts; slow to bolt; one of the best varieties for areas with hot summers.

Hot Weather: best all-around variety for spring, summer, fall and winter in South; heads big, blanching, buttery; no sun too hot, no cold too severe in mild areas.

Webb's Wonderful: one of the most consistently popular and reliable of the crisphead types; large heads with well-flavored crinkly leaves; slow to run to seed even in hot, dry weather.

Tom Thumb: the smallest variety; well-flavored butterheads; needs only 6 in (15 cm) when mature; ideal for small gardens, frames or containers.

Head lettuce (*winter/spring varieties*)
Arctic King: good for autumn sowing; small, compact heads with pale green, crumpled leaves.
Deci-Minor: the best Boston type for winter greenhouse forcing; very responsive to short days; not the best for outside culture.
Iceberg: compact, medium heads with few outer leaves; leaves light green, wavy, fringed, crisp and tender; very vigorous and hardy.
Imperial Winter: extremely hardy; one of the largest varieties for autumn sowing; very reliable.
Jack Frost: upright, dark green and more than usually tolerant of cold; for late crop in North, winter/spring in warmer areas.
Ostinata: another European Boston type lettuce; best used in warm climates and for hydroponic culture.
Stokes Evergreen: rather upright; hardier than Great Lakes; useful in North for fall harvesting, in warmer areas for winter/spring cropping.

Cos lettuce (*Romaine*)
Little Gem: a semi-cos variety; the leaves are glossy and the heart a mass of crunchy, sweet-flavored, blanched leaves.
Paris White: noted for its resistance to bolting; very large cos with self-folding leaves; crisp and sweet.
Parris Island: a dark-leaved sort that

National Vegetables Research Station

▲ Arctic King

Harry Smith

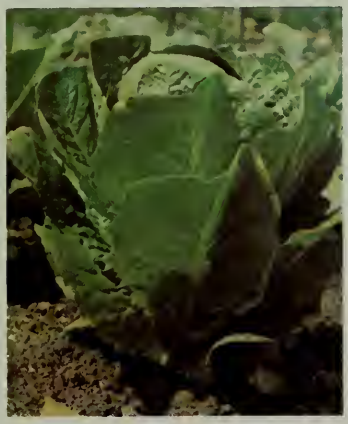
▲ Dark Green Boston

Brian Furner

▲ Butter King

tends to resist mosaic disease; a vigorous grower; stands heat, make repeat sowings April to July in North for summer cutting.

Valmaine: somewhat similar to Parris Island but also has some added resistance to mildew; also heat-resistant, treat the same way; a good summer crop for northern areas.



Harry Smith

▲ *Paris White*

Loose-leaf (American) lettuce

Black-seeded Simpson: well-known old variety; very early, popular for transplanting in frames or for early spring crops; larger than Grand Rapids; suitable for greenhouses.

Grand Rapids Forcing: light green, curled; popular for winter greenhouse, frames, or for outdoor planting in spring and early summer.

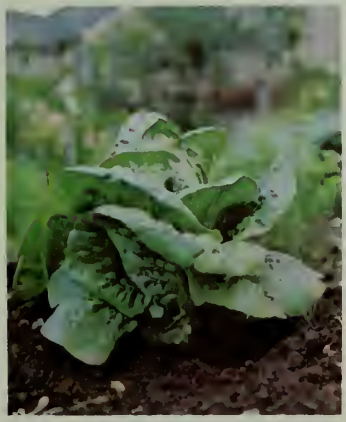
Green Ice: new, very crisp and tasty in salads; leaves wavy with fringed edges; long-season grower, one of the slowest to go to seed.

Oak Leaf: one of the fastest growing lettuce types; forms tight rosettes of long, spear-pointed leaves that keep coming as outer ones are removed. Oak Leaf is the most heat-resistant loose-leaf sort.

Salad Bowl: the best of the loose-leaf varieties; deeply curled green leaves resemble endive; large with crisp and tender leaves; does not bolt; sow outdoors from midspring to midsummer; excellent for containers.

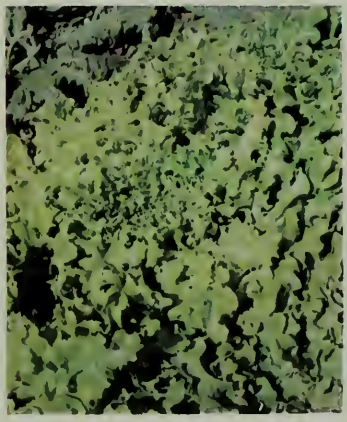
Slo-bolt: dwarf and compact; stands midsummer temperatures better than most lettuce; good in warmer areas.

Ruby: recommended loose-leaf variety; leaves are tinged with red. Ready to start harvesting in a month.



Brian Furner

▲ *Little Gem*



Pat Brindley

▲ *Salad Bowl*

Pests & Diseases

Lettuce can be bothered by a number of pests and diseases and, although most of them are not serious, precautions should be taken to ensure a healthy crop.

Lettuce root aphids: lettuce root aphids can attack the roots and collars of growing plants, causing the lettuce to turn yellow, wilt and rapidly decay. Different varieties have different levels of susceptibility. Attacks are most serious in late summer, and can be a particular problem in dry weather, when the moisture content in the plants is already low. The roots appear yellow and covered with a white woolly substance. The flies will be attracted to any decaying lettuce in the area, so pull out and burn any lettuce stumps or remains of plants. Lettuce rows should be hoed regularly to destroy weeds which could act as hosts to the pests. A dressing of naphthalene at 2 oz per sq yd (60 g per sq m) or watering between the rows with derris in early summer are useful precautions. Marigolds deter them.

Eelworm: eelworms (nematodes) are microscopic creatures which attack the roots of lettuce, producing small knobs on them and weakening the plants severely. The lettuce plants wilt and die. Destroy any affected plants immediately, and do not grow lettuce on the same ground for at least five years, as the eggs can remain there dormant.

Lettuce root maggot: this maggot, also called the chrysanthemum root maggot, causes severe injury to the roots of lettuce and chrysanthemum. The flies lay their eggs in the soil near the plants and the small, yellowish maggots hatch out and bore into the roots, causing the plants to wilt and die. Lettuce should never be grown too close to chrysanthemums, and never on the same ground. Reduce egg-laying by dusting around

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▲ *Aphids attack lettuce in spring, checking growth and spreading diseases.*

Ministry of Agriculture Fisheries and Food

▲ *Gray mold fungus causes the lettuce stem to blacken and the roots to rot away.*

Ministry of Agriculture Fisheries and Food

➤*Plants with mottled yellow leaves and stunted growth—mosaic virus symptoms.*

the base of the lettuce with flake naphthalene at weekly intervals in late spring and early summer. Maggots can be killed by watering with approved materials, applied according to the manufacturer's instructions.

Aphids: both young and mature lettuce plants are at risk from aphid attacks. The insects swarm on young summer lettuce in mid to late spring, checking growth and preventing them from hearting. Attacks are usually worse in a dry spring, as there is no rain to wash off the pests. Older plants can also be attacked, whether grown outdoors or in a greenhouse. Prevent aphid attacks by spraying with a nonpoisonous spray, such as pyrethrum, in spring. A fumigated greenhouse should be free of aphids, but if any are seen then spray the plants. Never put infested plants on the compost heap.

Slugs: as with all leafy crops, slugs are a menace to lettuce. They eat holes through the leaves and can quickly destroy a crop. Destroy slugs with methiocarb or methaldehyde baits.

Gray mold: gray mold fungus is the most common problem a lettuce grower will encounter, and you can easily identify it by the gray moldy spots found on the leaves. The disease can attack plants at all stages of growth, and the result is always rapid decay. The disease usually enters the stem at soil level, often through a dead outer leaf, or through yellowing seed leaves in young plants. Carefully remove any bits of dead or dying leaves from lettuce and, if the disease appears, remove and destroy any infected plants, along with the soil from around their roots. Spraying with an approved material according to the manufacturer's instructions can be quite effective. Under glass, if gray mold has been a problem, sterilize the soil six weeks before sowing by watering with a formalin solution.

Downy mildew: certain varieties of lettuce are subject to downy mildew, often seen as whitish spots on the leaves of overcrowded seedlings, or on mature plants. To prevent, thin seedlings at an early stage, regulate watering and ventilation under glass. Zineb or other sprays applied according to the manufacturer's instructions give quite effective control.

GUIDE TO LETTUCE TROUBLES

Symptom	*Probable cause*
Wilting, dying plants	Lettuce root aphid Eelworm Lettuce root maggot
Yellowing roots covered in white wool	Lettuce root maggot
Larvae in seed	Lettuce seed fly
Holes in leaves	Slugs Ring spot
Moldy gray spots on leaves	Gray mold
White spots on leaves	Downy mildew Ring spot
Brown patches on leaves	Bacterial spot
Mottled yellow leaves	Mosaic virus

Mosaic virus disease: aphids spread mosaic virus disease of lettuce, which produces yellow mottled leaves and stunts the growth of plants. The infection can also be carried in the seed, so be sure your seed is certified clean. There is no cure for mosaic virus disease: burn infected plants and destroy any aphids with pyrethrum.

Leaf spot disease: lettuce can be affected by several leaf spot diseases. Bacterial spot causes browning of the leaves along the veins and at the edges. Autumn lettuce which has been heavily manured or over-watered and plants grown under glass are most often affected. Maintain a careful balance of moisture to avoid.

Ring spot is a fungus disease sometimes seen in cold, damp weather. It starts as brown spots on leaves, and the spots turn white and fall out, leaving big holes. The lettuce is quickly made unusable. Good ventilation in frame or greenhouse will discourage the disease, and crop rotation will lessen attacks outdoors. Destroy infected plants.

growing ideas

Luscious Treats for the Family

Easy to grow and delicious to eat, loganberries or one of the other hybrid berries can be a delightful addition to your fruit garden.

The bramble berry family is a large and varied one, with a number of fruits developed in the last hundred years or so. Loganberries are the most successful and vigorous-growing member of this family, which includes boysenberries, youngberries, veitchberries and wineberries, and also the most widely grown. Thought to be a cross between the American blackberry and a raspberry, they originated in California in the 1880s, in the garden of a Judge Logan. The long red berries look like large raspberries, but the flavor is quite tart. Loganberries are excellent for cooking, freezing and jam-making, and they make an interesting dessert if eaten when fully ripe.

Loganberries are cane fruits, that is, they fruit on stems called canes, but only on those produced the previous year. The canes are winter hardy, so long as they have stopped growing and are hardened off before the temperature falls too low. They are suitable for most mild areas, but do not do as well in the Northeast. The plants are self-fertile and attractive to bees and other insects.

If you decide to grow loganberries, choose a spot in your fruit garden which

Harry Smith

The tart, red fruits of the loganberry are ready for harvesting from midsummer.

▲ *The new fruiting canes of the loganberry bush must be tied in to the supporting wires.*

gets plenty of sun. The plants will grow in partial shade under trees or against walls, but the best results will be obtained in a sunny site where young canes can grow and mature properly. Avoid frost pockets because, although flowering is late, the plants are not completely winter hardy and in severe weather the top growth can be badly damaged, though the roots and crown should be safe. Be sure that the plants are sheltered from winds, which may damage young leaves or fruiting laterals.

Loganberries need a lot of moisture, so the soil should be capable of holding a good reserve of water. Light, sandy soils or heavy loams are suitable, but if your garden is on heavy clay, you will have to add generous quantities of well-rotted organic matter before planting. It is a good idea to avoid planting on a site previously occupied by loganberries, blackberries or raspberries, because of the danger of passing on diseases such as anthracnose, blights, wilts and rusts.

About two to four weeks before planting, remove all perennial weeds completely, taking particular care to get out the roots of such weeds as bindweed and couch grass, and dig the site well. Dig in well-rotted garden compost or farm manure at the rate of 2½ gal per sq yd (12 L per sq m).

For a really successful crop of loganberries, you should purchase certified disease-free one-year-old plants from a reputable nursery. Loganberries are safest planted in early spring, when the plants are still dormant. If conditions are very wet when the plants arrive, unwrap them and put them into containers, using a good soil or potting mixture, or heel them in a shallow trench in a sheltered corner, until the weather improves.

Like all cane fruits, loganberries should be trained on supports, and it is

best to erect these supports before planting. Use posts 7½ ft (2.3 m) long, and drive them into the ground to a depth of about 1–1½ ft (30–45 cm) at a spacing of 6 or 7 ft (1.8 or 2.2 m). The posts at the ends of the rows must be substantial and well supported. Then stretch galvanized wires tightly along the row at heights of 3 ft (1 m), 4½ ft (1.3 m) and 6 ft (1.8 m).

Now you are ready to plant your loganberries. Remember that the roots of young plants must be well spread out in the planting hole, so be sure to dig it wide enough. Canes should be planted at the same depth that they were in the nursery; the soil mark will tell how deep to dig the planting hole. Space the plants 6–10 ft (1.8–3 m) apart, depending on whether the variety is a vigorous or weak grower, and put them in the holes gently, covering the roots with loose, friable soil. Firm the soil down, and when planting is complete, cut back the canes to 1 ft (30 cm), if necessary.

Loganberries do not require a great deal of attention, compared with other plants in the fruit garden. Mulching is important for retaining moisture; apply lawn mowings, garden compost or well-rotted manure in early spring. If your soil is sandy, apply sulfate of potash at 2½ oz per sq yd (75 g per sq m) just before mulching. A biennial application may be in order for maximum production on light soils. In dry weather, it is most important to water the plants heavily, otherwise the current year's crop will be reduced, and the canes for the following year few and weak.

Training the canes is the major work in loganberry cultivation. This can be done by using the wire supports erected before planting. Tie the laterals into a fan shape as they grow. In the second and following seasons, as new shoots grow, train these in as well, separately from the fruiting shoots, and tie them to the wires, so that they are taken vertically up the center and trained along the wires at the top on either side.

Loganberries begin to ripen in summer, and they can be harvested over a period of several weeks. Constant picking will give you a better crop of late fruit. Pick the fruit when it is dry, as damp fruit molds quickly, removing the plug at the same time. You can pick loganberries as soon as they are red and tart, or leave them to ripen if you want them sweeter to eat raw.

After fruiting, cut old canes to the ground, and release the young canes from the wires. Lay them on the ground in an orderly way, and then tie them back to the wires in a fan shape. Retain a maximum of about eight of the most vigorous canes on each plant, and cut out the remainder completely. Also cut out any dead matter after fruiting.

The usual loganberry variety available is very prickly, which makes pruning and training unpleasant, but there is a new thornless loganberry, which is excellent, except it has slightly less vigorous growth.

If you like loganberries, you may want to try growing one of the similar hybrid berries. All are cultivated in the same way, with a few variations. The larger fruit nurseries should carry one or more of these unusual fruits.

Boysenberries are another California-bred fruit, with long, seedless, nearly black fruits of good flavor. They are a good choice if the climate in your area is warm and dry.

The youngberry also prefers a warm and dry garden. It is an interesting berry, large and round and almost black when ripe, but with a flavor similar to the raspberry.

Try veitchberries if you live in a slightly cooler climate. This is a cross between autumn-fruiting raspberries and a type of blackberry, and it produces delicious deep red fruits which are at their best just after the raspberry season.

Wineberries also fruit just after raspberries. Wineberry plants, which have arching stems and are covered in red bristles, are sometimes grown as ornamentals in their native Japan, although the pale orange-red fruits are tart and pleasant in flavor.